USER SERVICE REQUIREMENTS

THIRD-PARTY MAINTENANCE

INPUT

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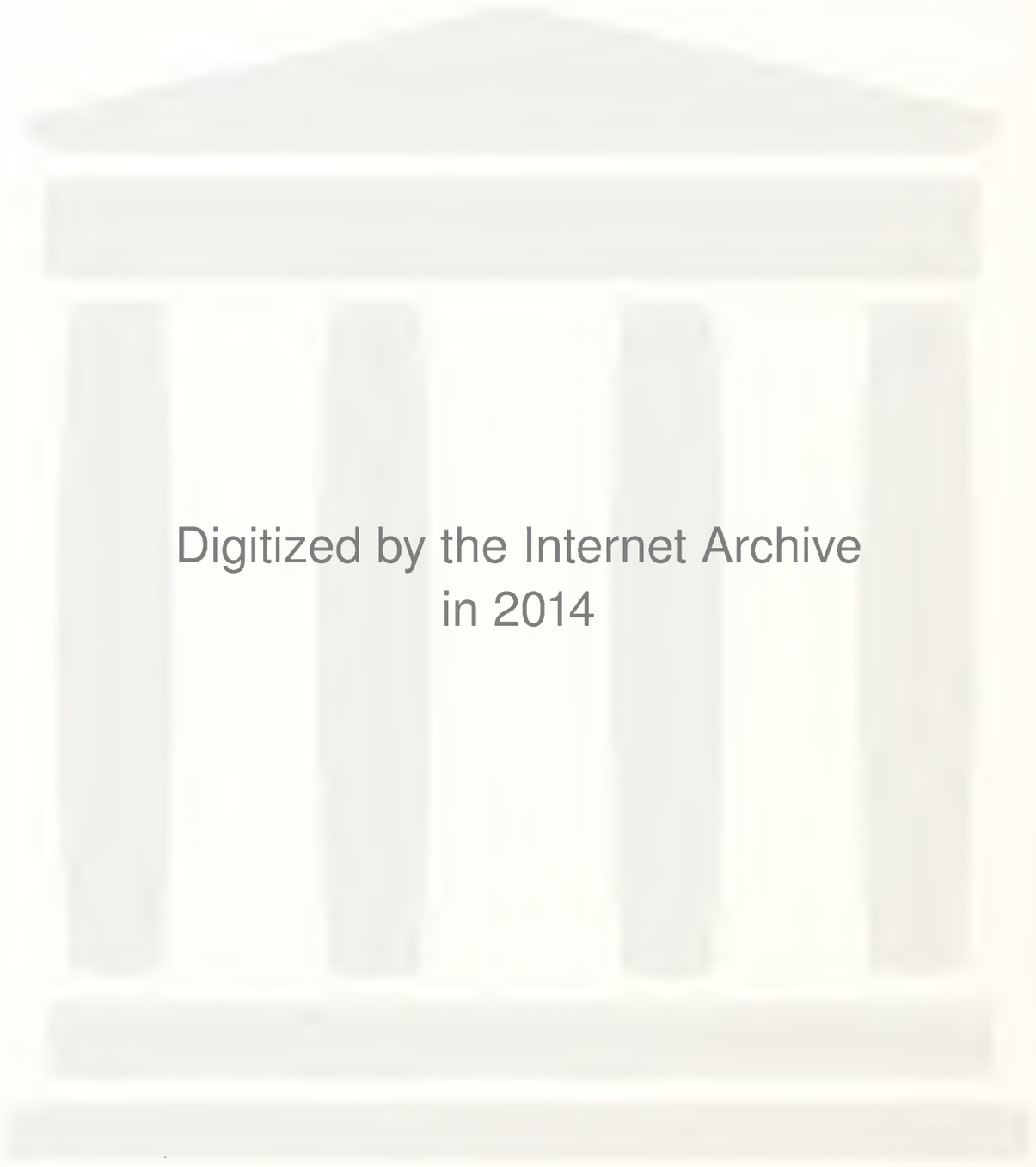


USER SERVICE REQUIREMENTS
THIRD-PARTY MAINTENANCE

ABSTRACT

This report analyzes third-party user service requirements, particularly in the areas of hardware maintenance and software support services, professional services (e.g., planning and consulting), and educational services (e.g., training and documentation support). The report covers user expectations for service and the level of service currently received by the users.

Each of the equipment categories covered by INPUT are analyzed by this report, including large systems, small systems, peripherals, and microcomputers.

In addition, an analysis of the current user market in respect to purchase criteria and future usage is provided.

This report contains 90 pages, including 39 exhibits.

USER SERVICE REQUIREMENTS
THIRD-PARTY MAINTENANCE

CONTENTS

USER SERVICE REQUIREMENTS
THIRD-PARTY MAINTENANCE

EXHIBITS

1 INTRODUCTION

I INTRODUCTION

A. SCOPE

- This report on the customer services requirements of third-party maintenance users is produced by INPUT as a part of the 1985 Customer Services Program in the U.S. for clients of that program.

- The objective of this report is to identify and analyze the service requirements of an often-ignored but steadily growing population of computer users who receive their maintenance from third-party maintenance companies. This market, which will exhibit an annual growth rate of 17% from 1984 to 1989, warrants the attention of not just TPM vendors, but also equipment manufacturers, in order to evaluate the effect of TPM on their own service business.

- The report begins by breaking down the current TPM user market--who uses TPM, for what equipment, and, most importantly, for what reasons. The TPM business base is broken down by contract type, service delivery method, and service coverage. By analyzing the current use patterns of TPM and non-TPM users, it will be easier to set up attractive service offerings that will assure service growth.

- The report continues by analyzing TPM vendor performance as reported by current users. Where possible, comparison with manufacturer-supplied service performance is evaluated. In all cases, product-by-product analysis is

performed--both traditional service measurement criteria, such as mean-time-to-respond and mean-time-to-repair, and the increasingly important extended services, such as consulting and training.

- The report concludes with an analysis of the future trends in the TPM market and how these trends will affect user satisfaction. Growth areas, such as software support and flexible service contracts, are presented as recommended service alternatives.

B. DEMOGRAPHICS

- As shown in Exhibit I-1, 219 current users of third-party maintenance were interviewed for this report, responding to the questionnaire found in Appendix A. Exhibit I-1 also provides an industry breakdown of the responses. Appendix B provides the data base structure that results from the questionnaire.

- The source of many of these responses were the over 1,200 telephone interviews performed on large, small, telecommunications, and microcomputer users for each of the respective reports covering that product. In addition, some TPM vendors supplied additional lists of users to be interviewed. As in all INPUT user requirements reports, respondents are assured of complete confidentiality to ensure an unbiased response.

- Also, as with all other INPUT user requirements reports, all efforts are made to identify and interview the person in each user organization that has both purchase authority and intimate knowledge of the quality of service provide on each computer product. In most corporations, INPUT has identified the information systems (IS) director, also known as the data processing manager, as the best qualified person to perform the interview. As shown in Exhibit I-2, the majority of surveys performed were with this person.

EXHIBIT I-1

SAMPLE BY INDUSTRY SERVED

INDUSTRY	NUMBER OF RESPONSES
Process Manufacturing	73
Discrete Manufacturing	22
Transportation	8
Utilities	3
Banking and Finance	10
Insurance	4
Medical	4
Education	20
Retail	7
Wholesale	6
Government	15
Services	19
Other	28
Total	219

EXHIBIT I-2

SAMPLE BY TITLE

TITLE	NUMBER OF RESPONSES
Vice President	4
IS Director, DP Manager	133
Operations Manager	27
Programmer, Systems Analyst	23
Other	32
Total	219

- Through our sampling procedure, we hoped to achieve an interview base that properly reflected the current market shares held by leading TPM vendors. As shown in Exhibit I-3, we were only partially successful.

EXHIBIT I-3

1985 TPM USER SAMPLE
BY TPM VENDOR USED

TPM VENDOR	NUMBER OF MENTIONS	TYPICAL MANUFACTURERS SERVICED
Sorbus	27	IBM 370, IBM Peripherals
Computerland	12	IBM PCs, Apple
CDC	10	IBM 370, DG MVP 1000
General Electric	8	DG Nova, HP 1000
TRW	8	Data Products, Other Peripherals
Data Serve	3	IBM Terminals
Data General	3	IBM PC
McDonnell Douglas	3	DEC VAX 11/780, DEC System 10
Braegen	2	DEC Terminal
Datapoint	2	
Xerox	2	
Other	139	
Total	219	

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

- This executive summary is designed to help the busy reader quickly review the key research findings of this report. Each main point is summarized as an exhibit and an accompanying script is given on the facing page. The format is designed to facilitate the use of this executive summary as an in-house overhead presentation.

- The purpose of this report is two-fold. First, the report attempts to define a marketplace, the third-party maintenance (TPM) market, which will demonstrate a 17% average annual growth rate over the next five years. This report will discuss who uses TPM, how they use it, and why they use it.

- Second, and perhaps most important, is a discussion of TPM user satisfaction, which will reflect the strengths and weaknesses in service delivery, often with direct comparison with manufacturers' service performance, and identify areas of opportunity and concern for TPM service organizations.

A. TPM GROWTH MARKETS

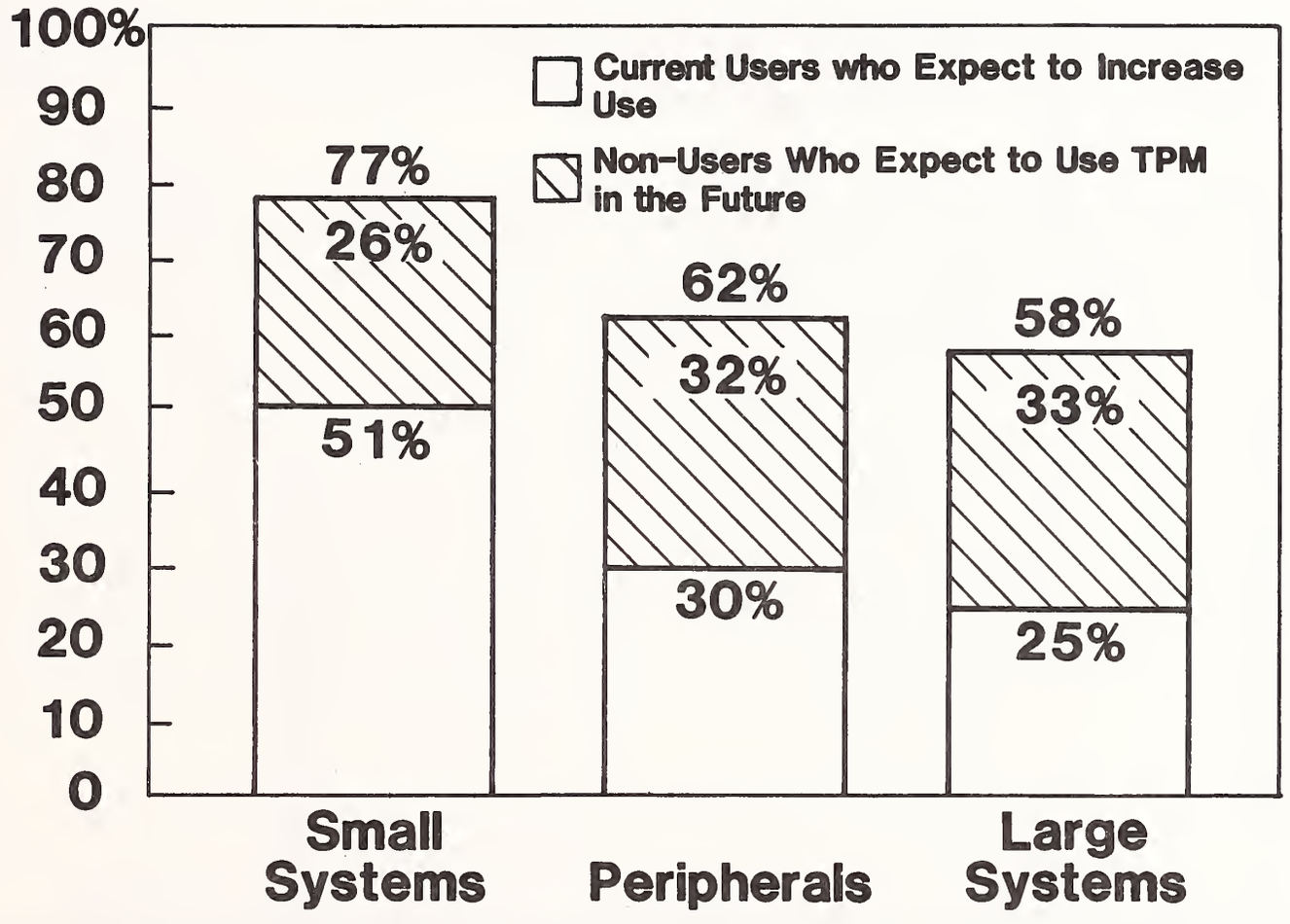
- The 1985 customer service market grew 17% from 1984, growing to $13.2 billion in 1985 from $28.7 billion in 1984. During that same span, the third-party maintenance market (TPM) grew at an even faster rate, going from $1.14 billion in 1984 to $1.33 billion in 1985. Principal factors that contributed to this growth include increased user sensitivity to service pricing and improved TPM vendor performance in identifying and then attacking higher growth market segments.

- Fastest growing of these market segments is the small-system market, comprised of superminicomputer, traditional minicomputer, and small business systems. Exhibit II-1 shows both the high satisfaction of current users who are planning to increase their use of TPM and the large number of non-users who plan to use TPM in the near future.

- TPM penetration in the small systems market has been high for a number of reasons. Foremost is the large number of independent peripheral manufacturers that have produced aggressively priced, high performance peripheral devices. DEC, the largest vendor in the small systems market, contributed to this by encouraging OEMs and VARs to compose mixed-vendor systems. In addition, a large percentage of small system TPM business is a result of older (five years and more) systems.

- A concern to TPM vendors who target this market should be the ever increasing involvement by small systems vendors, such as DEC, Honeywell, NCR and, most recently, AT&T, in maintaining foreign equipment located at their CPU sites.

TPM GROWTH MARKETS



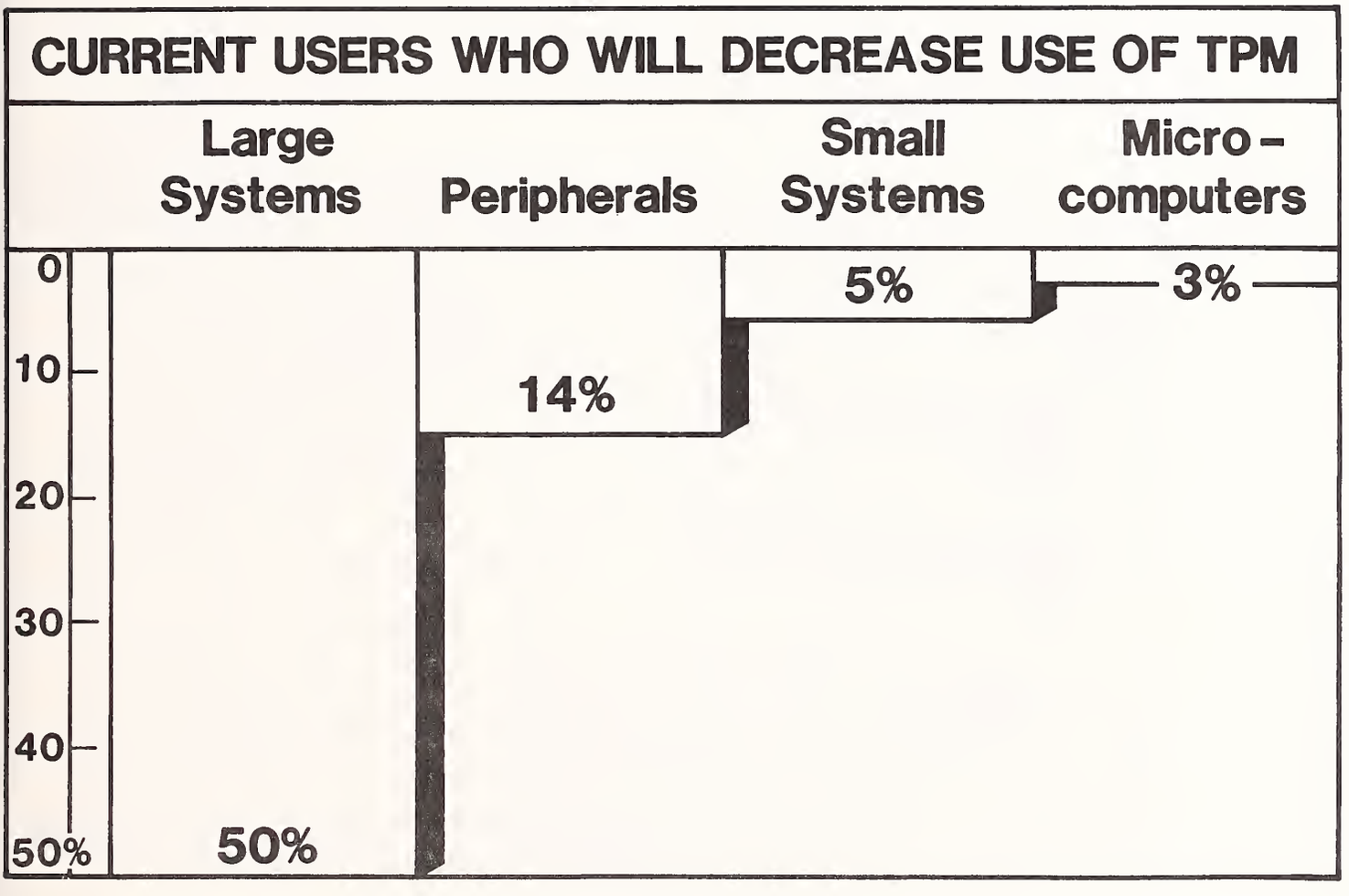
B. DECLINING TPM MARKET SEGMENTS

- A computer equipment market that has been traditionally resistent to TPM penetration, particularly on current products, is the large systems market, comprised of supercomputers and mainframe systems that typically cost over $350,000. Although this market has been a target market for third-party vendors, most of the TPM penetration that has occurred is on old or obsolete equipment that the manufacturers have encouraged users to replace by raising service prices (as Amdahl has done with the 470 series).

- The large systems market has been particularly difficult for TPM vendors to enter for a number of reasons. Large systems vendors have been effective in controlling their product base, aided by the fact that most corporations that would use large systems tend to be congregated near large urban areas, thus limiting product dispersal that would provide a TPM opportunity. Second, manufacturer-service vendor performance is most typically of extremely high quality, including many necessary support offerings in the educational and professional service areas. In addition, large systems users place a high priority on the improved access to spare parts that goes along with manufacturer-supplied service. Lastly, large systems users display the most "loyalty" to the equipment manufacturer, although this factor's influence is lessening.

- TPM vendors who specifically target the large systems market should be particularly concerned about the findings of Exhibit II-2, which show that half of the large systems respondents that use TPM will decrease their use. As a result, TPM vendors will need to become more "vertical-market" oriented in identifying and attacking this market segment.

DROP IN LARGE SYSTEMS TPM USAGE



C. TPM SELECTION CRITERIA

- Exhibit II-3 shows that, to no one's surprise, vendor reputation for service quality and service pricing were the most important factors in choosing a TPM vendor over manufacturer-supplied service or another TPM vendor. Last year's users, however, reported more concern over vendor responsiveness, through geographic proximity and improved response times, and the TPM vendors' ability to service mixed-vendor shops as why they chose TPM as their service source. This shift in purchase decision warrants further discussion.

- The elevation of price as a selection criteria indicates the growing price sensitivity to service that naturally results from increased competition. TPM companies face increased competition not only from more and more independent TPM firms entering and expanding their markets, but also from traditional equipment manufacturers who are entering the third-party service arena, both in maintaining foreign peripherals at their own CPU locations and even expanding into other manufacturers' CPU sites. This expansion by manufacturers into the TPM market should be cause for concern to traditional independent TPM vendors.

- The increased activity by equipment manufacturers has also contributed to the de-emphasis of mixed-vendor capabilities as a TPM selection criteria, since many equipment manufacturers are beginning to provide extensive mixed-vendor capabilities of their own. This trend should continue as more and more equipment manufacturers increase their own TPM capabilities.

- Most important, TPM vendors will need to continue to emphasize and improve the marketing of their services, since a large amount of new business is still generated by word-of-mouth recommendations. TPM vendors will need to follow the lead of such major TPM vendors as TRW and Sorbus in developing their "brand image" and name recognition.

TPM SELECTION CRITERIA

RANK 1985	RANK 1984	CRITERIA	IMPORTANCE IN SELECTING TPM
1	3	Vendor Reputation	7.8
2	5	Price	7.2
3	4	Response Time	7.2
4	1	Mixed-Vendor	6.8

Scale: 1 = Low, 10 = High

D. TPM USER SATISFACTION WITH SERVICE

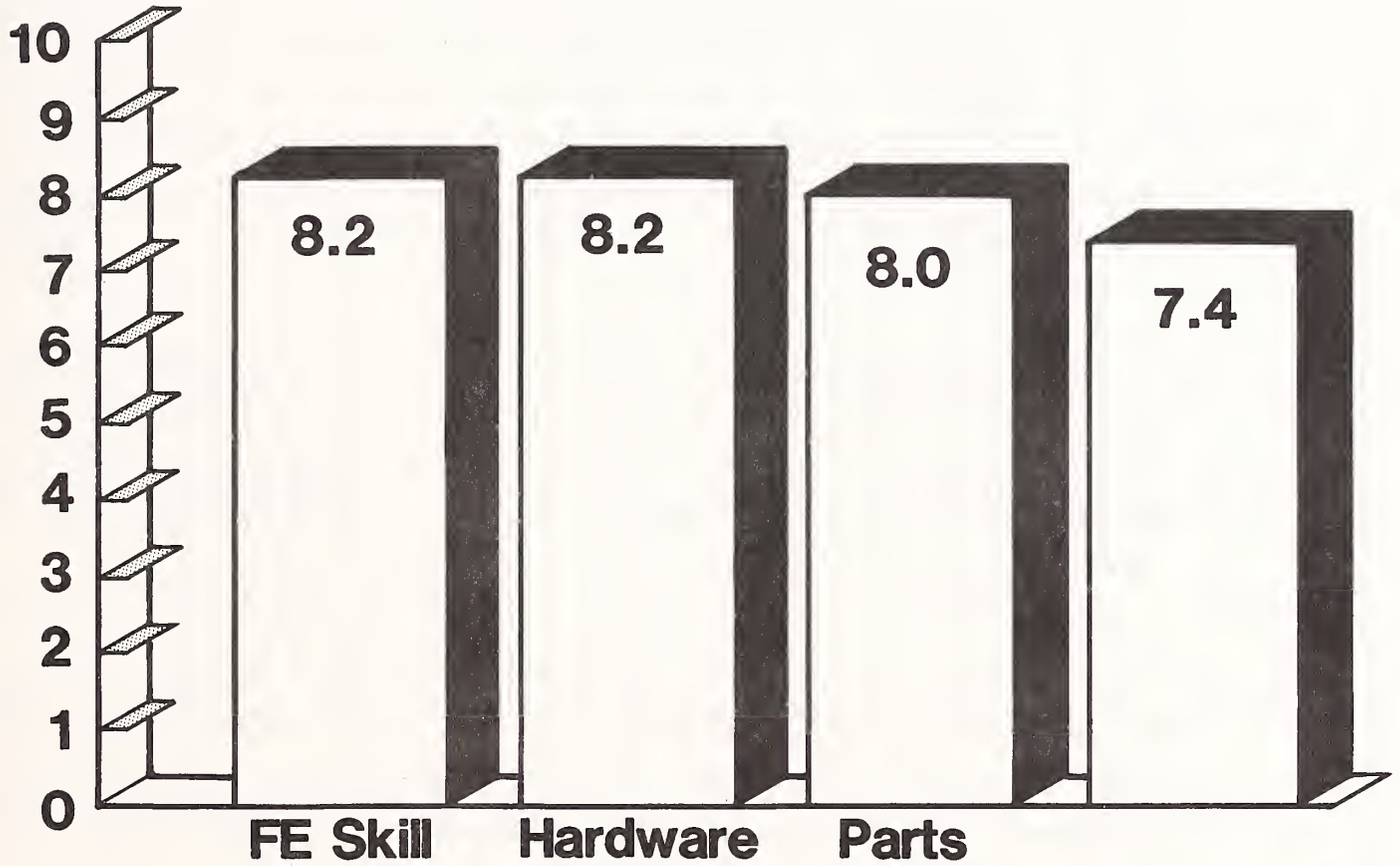
- On the whole, TPM vendor performance is quite acceptable to the users who have opted for TPM over manufacturer-supplied maintenance. Significantly, users of TPM report high satisfaction rates with the most critical areas of parts availability and field engineer (FE) skill level, as shown in Exhibit II-4. In fact, in some product areas, such as the large systems market, TPM users give higher subjective ratings in these service areas than the respective users of manufacturer-supplied service.

- To be fair, it must be recognized that a large number of users are going to be more satisfied with their TPM vendor if they had previously used the manufacturer and, for some reason, had opted for TPM service instead. In some situations, TPM vendors have the flexibility to provide customized service based, to a large extent, on satisfying whatever requirements that the user could not have satisfied by the manufacturer, particularly in mixed-vendor user sites.

- Also, some TPM vendors, such as Sorbus and TRW, have been effective in setting up a service management strategy that rivals those of the manufacturer service organizations, especially in the areas of automated dispatching, field engineer recruiting and training, and parts management. Certain TPM vendors, particularly Sorbus, have been effective in making arrangements with large users in which the user acquires and often stores high-priority parts, assuring that downtime resulting from the lack of a spare is limited.

- This is not to suggest that all TPM users are happier, or even as happy, with their service than users of manufacturer service. A large number of users of small TPMs correctly identified that their TPM service provider in some cases overextended their capabilities in providing responsive service. However, the TPM industry is currently going through a period of merger and acquisition, which should help improve overall TPM performance.

TPM VENDOR PERFORMANCE



Rating 1 = Low Satisfaction, 10 = High Satisfaction

E. TPM MARKET IN A FLUX

- Any analysis of the TPM industry would be incomplete without mentioning the dramatic changes in the lineup of industry leaders. As predicted in INPUT's report on the industry last year, 1985 proved to be a year of mergers and acquisitions. Sorbus was purchased by Bell Atlantic at the end of 1984, Western Union (the sixth largest TPM firm in 1984) is up for sale, TRW is in an acquisition mode, and a number of smaller firms have either been acquired or have mereged, causing a significant realignment of the industry. And by the end of 1985, the service organization of Datapoint, spun off and renamed Intelogic Trace, Inc., will definitely rank among the top three independent TPM vendors.

- The impact of this will not be lost on the user, especially during a time when a computer industry buzzword is "fall out." We have already seen that users value vendor reputation most in choosing a TPM vendor, demonstrating the importance of showing both quality of service and organizational stability in marketing a vendor's services.

- INPUT believes that the TPM market will continue to reflect a period of acquisition and merger. Larger TPM vendors will continue to look at smaller, more vertically-oriented service organizations that can provide them market opportunities and technical expertise, especially in such high growth areas as telecommunications and factory automation.

TOP FIVE TPM VENDORS IN 1985

RANK	TPM VENDOR	1985 TPM Revenues ($Millions)	Market Share (Percent)
1	TRW	$232	17.4%
2	SORBUS	202	15.2
3	Control Data	110	8.3
4	RCA	86	6.5
5	General Electric	68	5.1

III THIRD-PARTY MAINTENANCE USER MARKET

III THIRD-PARTY MAINTENANCE USER MARKET

A. TPM PRODUCT MARKET

- The total customer service market for 1985 will be $13.15 billion, as shown in Exhibit III-1. Although the overall economy has diminished demand for new computer shipments, the customer service market continues to grow as a result of increased user demand for improved maintenance and support of their equipment coupled with improvements by service vendors in the organization and delivery of the service offerings. This growth should continue even during the computer sales slump as service vendors emphasize the more profitable segments of the service business, specifically software support and other post-sales support services.

- The third-party maintenance portion of the total customer service market will be just over $1.3 billion in 1985. This represents an increase of about 17% over 1984, roughly matching the overall customer service growth from 1984 to 1985. Increased demand for quality service and support, especially in high growth market segments such as microcomputer service and telecommunications support, should continue TPM growth. Exhibit III-2 provides a breakdown of the current TPM market by product type.

- Segmentation of the TPM market reflects the traditional target markets for TPM growth, namely older systems and equipment unserviceable by the product vendors, either due to geographic location or lack of a service organi-

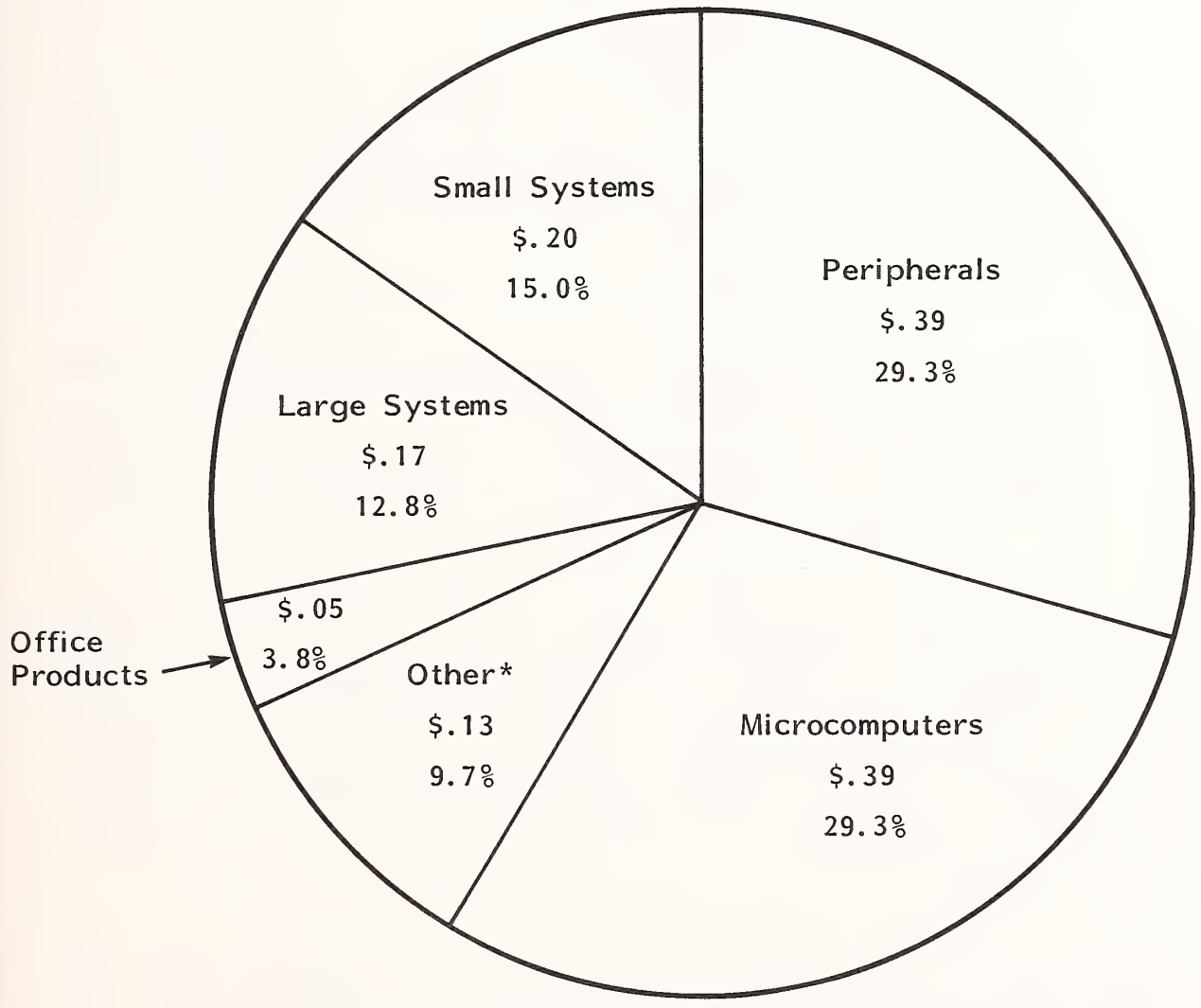
EXHIBIT III-1

1985 CUSTOMER SERVICE MARKET

PRODUCT CATEGORY	1985 TOTAL SERVICE MARKET ($ Billions)	1985 TPM SERVICE MARKET ($ Billions)	TPM AS A PERCENT OF TOTAL SERVICE MARKET
Large Systems	$3.77	$.17	4.5%
Small Systems	2.31	.20	8.7
Peripherals	3.64	.39	10.7
Microcomputers	0.81	.39	48.1
Office Products	1.70	.05	4.7
Other*	.92	.13	14.1
Total	$13.15	$1.33	10.1%

EXHIBIT III-2

1985 TPM MARKET BY PRODUCT
($ Billions)



1985 Total TPM Service Market = $1.3

zation by the product manufacturer. Thus, we see the greatest TPM penetration into the following product markets:

- Small systems where continual product improvements render older equipment unserviceable by the equipment manufacturers.

- Peripherals where both age of product and geographic proximity encourage the use of TPM.

- Microcomputers where, at the start, almost no direct manufacturer support was available. Now, even with increased manufacturer activity in microcomputer maintenance, product dispersion will still allow TPM growth in this market segment.

- Telecommunications, a virtually untapped and unlimited market, where like the earlier microcomputer explosion of the early 1980s, telecommunications vendors need to concentrate their efforts on introducing products, leaving the service and support end of the market to TPM.

- Our sample reflects the relative strength of TPM in various equipment category segments. Exhibit III-3 shows that the largest portions of our sample are derived from the small systems markets, predominantly older IBM 4330s and Data General Nova minicomputers, microcomputers such as the IBM PC and Apple II micros, and the peripherals market, especially printers, terminals, and disk drives.

- Exhibit III-4 further illustrates TPM's strength in the small systems and peripherals markets. Fifty-one percent of all small systems users who currently utilize TPM service on their equipment expect to increase their use of TPM over the next year, while only 6% expect to decrease their use of TPM. Thirty-two percent of the peripheral users likewise expect to increase their use of TPM in the next year.

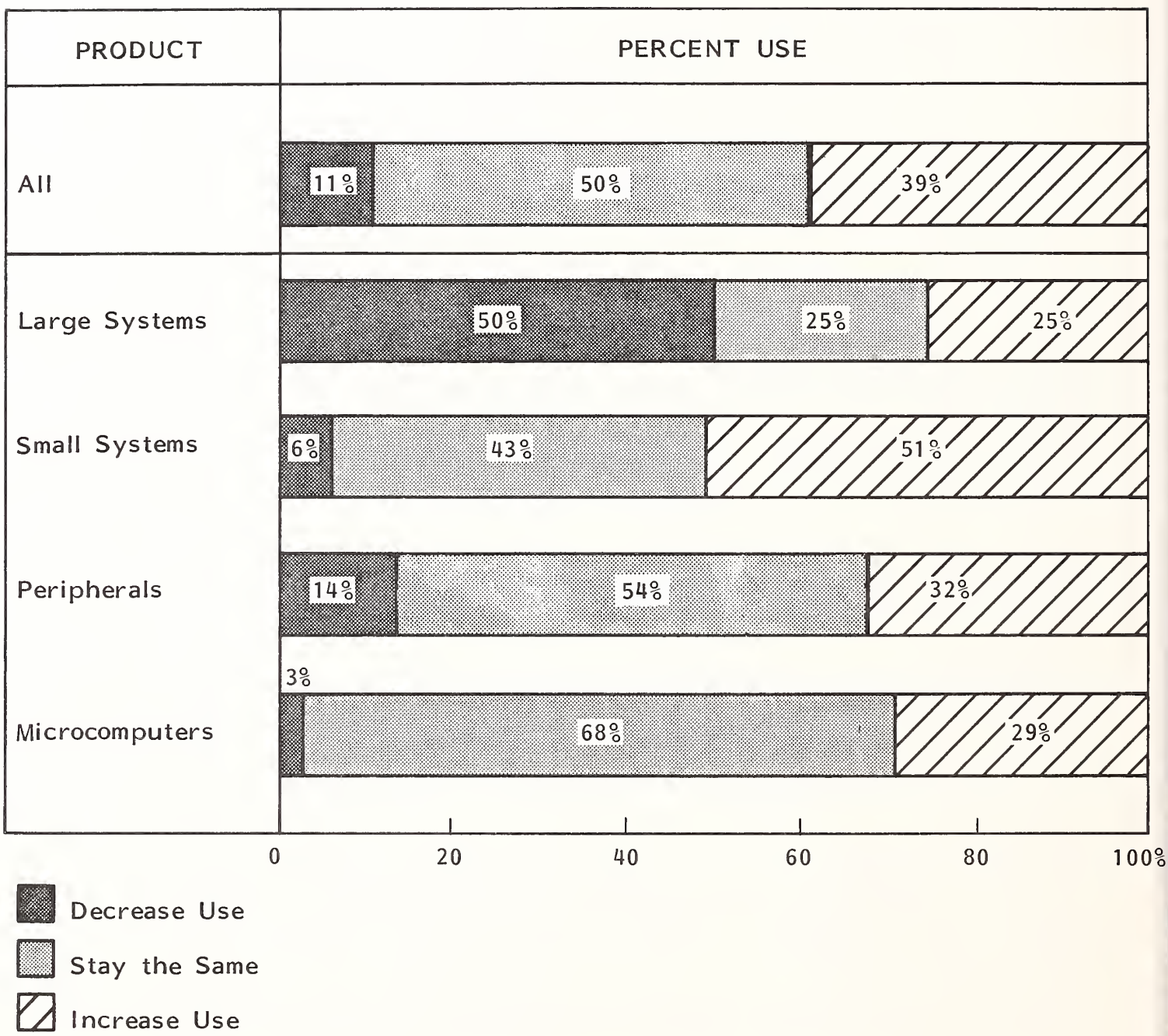
EXHIBIT III-3

1985 TPM USER SAMPLE
BY PRODUCTS SERVED

PRODUCT	NUMBER OF RESPONDENTS	PERCENT OF SAMPLE
Large Systems	10	4.6
Small Systems	49	22.4
Microcomputers	38	17.4
Tape Drives	2	0.9
Disk Drives	20	9.1
Terminals	37	16.9
Printers	39	17.8
Office Products	6	2.7
Other	18	8.2
Total	219	100.0

EXHIBIT III-4

CURRENT TPM USER FUTURE USE



- The large systems market does not appear to offer much growth potential to TPM vendors, with only 25% of the current users expecting to increase their use of TPM. Indeed, the large systems market for TPM appears quite shaky, as indicated by the 50% of the users who expect to decreas their use over the same timeframe.

- This concern is also demonstrated in Exhibit III-5, which shows that there was a drop in non-TPM user expectation to use TPM for their large sytems, from 38% in 1984 to only 33% in 1985.

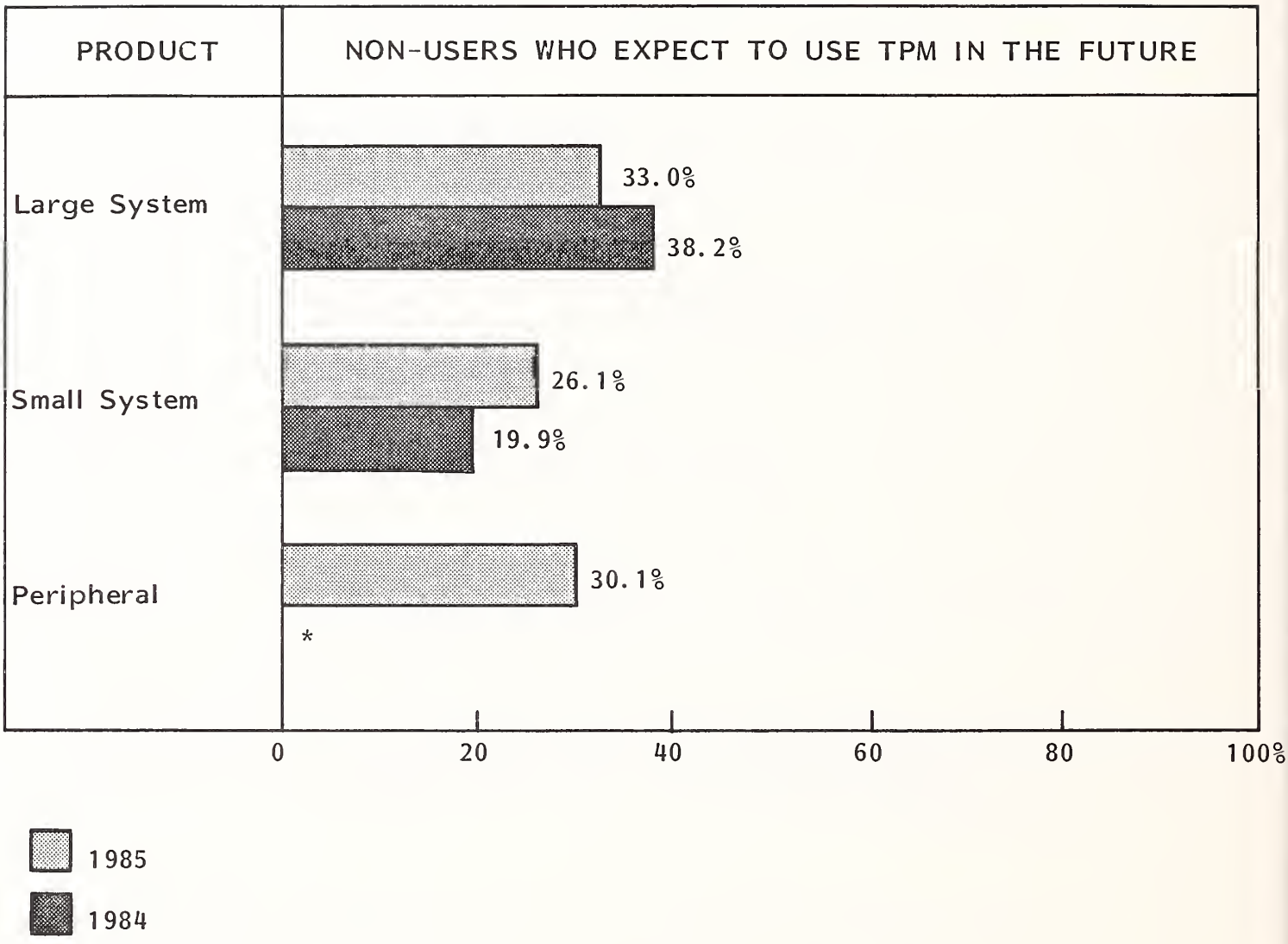
- This is not to suggest that other market segments should be ignored. The large systems market, for example, comprises only 12.8% of the current TPM market, with a slowly declining TPM penetration into that market. However, the growth potential of specific niches in this market is ever present, especially in the IBM-compatible market (Amdahl and NAS). Because the cost to the manufacturer for providing service to this dispersed market is very high, remote mainframe lcoations provide potentially lucrative opportunities. Since a mainframe service contract typically runs 3-8% of purchase price, and since large system users are most willing to commit to long-term service contracts, this particular market niche can prove to be very lucrative if corrently exploited.

- It is apparent that TPM vendors not only target specific product segments, but also specific manufacturers. Exhibit III-6 shows that, not surprisingly, IBM users were most represented in our TPM user sample, followed by DEC and Data General.

- The predominance of IBM users as a target market for TPM vendors is understandable, given the overwhelming number of IBM products out in the market. It would be unwise to overestimate the profitability of concentrating solely on this market, for a number of reasons. First, IBM is gradually reducing the service price umbrella for on-site maintenance of newly-introduced products, causing competitors to also lower service prices in order to

EXHIBIT III-5

TPM NON-USER FUTURE USE



* 1984 Peripheral Data Not Available

EXHIBIT III-6

1985 TPM SAMPLE BY MANUFACTURERS MENTIONED

MANUFACTURER	MENTIONS	TYPICAL PRODUCTS
IBM	59	IBM 370, PCs
DEC	16	VAX 11/780, VT 100
Data General	11	Nova
Burroughs	9	
Apple	8	Apple IIs
Texas Instruments	5	TI Professionals
Basic Four	4	
Centronics	3	6XXX
Decision Data	3	66XX
Sperry	3	
Tandy	3	TRS-80
Televideo	3	
*		

* The following manufacturers received two (2) mentions; ADDS, CDC, Compaq, Epson, Honeywell, Kaypro, Lear Siegler, NEC, Perkin Elmer, Prime, Printronix, Wang, and Xerox.

compete. Second, IBM is gradually increasing the TPM rates for all products, encouraging the purchase of newer products and service contracts. Third, IBM is becoming much more involved in the maintenance and support of their business microcomputers, which will impact a large number of TPM vendors who have relied on the largely unserviced PC market for service business.

B. TPM SELECTION CRITERIA

- In order to segment the potential TPM user service market properly, it is important to determine what initially attracts users to TPM as a service alternative. In 1984, INPUT found that the most important factor in the selection of a TPM vendor was the ability of the TPM vendor to provide complete service coverage for all the products at the user's site. The attractivenss of this ability to the user is obvious--single-source maintenance would be more responsive, more convenient, and more complete in the quality of service coverage.

- Unfortunately, there are few, if any, TPM service vendors who can realistically claim to cover all products at any one site. This realization is reflected in the 1985 TPM user sample, which relegated this decision criteria to the fourth most important factor in choosing their TPM vendor.

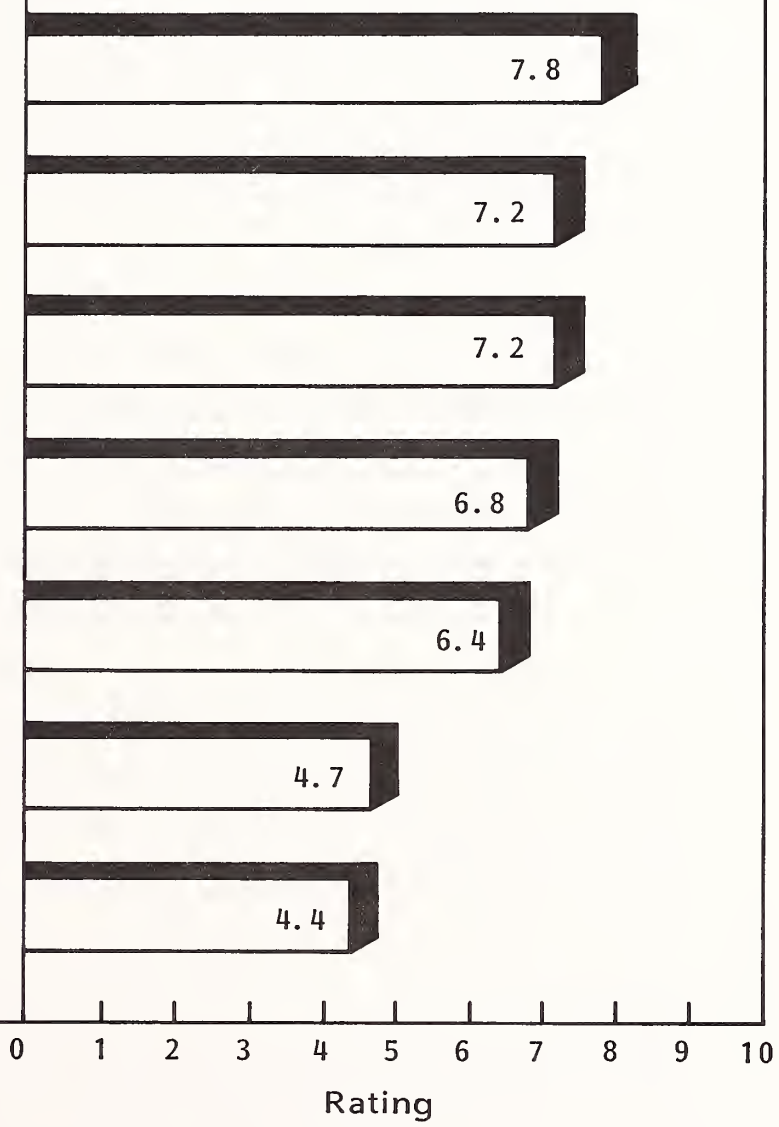
- Instead, TPM vendor reputation has become the most important factor in selecting a TPM vendor, as shown in Exhibit III-7. Users are understandably concerned with the quality of maintenance and support that they receive for their equipment. For a first-time TPM user, vendor reputation is communicated to the potential user through one or a combination of three sources:

  - Successful marketing campaigns which result in name recognition.

EXHIBIT III-7

TPM USER SELECTION CRITERIA

1985 RANK	SELECTION CRITERIA	1984 RANK
1	TPM Vendor Reputation	3
2	Price	5
3	Improved Response Time	4
4	Ability to Service Mixed-Vendor Hardware	1
5	Geographic Proximity	2
6	Availability of Software Support	7
7	Only Service Available	*



Rating: 1 = Least Important, 5 = Most Important

* 1984 Ranking Not Available

- Word-of-mouth recommendation from associates who have used TPM vendors in the past or from user group associations.

- Recent media attention placed on the developing TPM market.

- Until very recently, only the very largest TPM firms, like Sorbus and TRW, had developed a successful marketing capability, which contributed to the wide disparity between the very largest TPM vendors and the rest of the market. Instead, smaller TPM firms had to rely on word-of-mouth referrals user to user as the only source of new customers. Currently, the number of small TPM firms who are developing their own marketing capabilities through brochures, direct mails, advertisements in industry journals, and even telemarketing is on the rise, due in part to increased media attention on the TPM market.

- Traditionally, many TPM vendors have identified lower prices as the most important factor in the user's decision to select a TPM vendor. And in many market segments where the TPM vendor competes head to head with the equipment manufacturer, lower prices is the only benefit that the vendor can offer to a potential customer. Exhibit III-7 supports these vendors' perception of the importance of price as a selection of TPM in situations where all else is equal. The importance of price as a selection criteria can be lessened if the TPM vendor has correctly targeted a market where the equipment manufacturer cannot offer equal service, whether it be faster response times due to geographic proximity or the only service available to that user. In those target markets, lowered prices tend only to cut into the TPM vendor's profit margin, often needlessly.

- Equally important to the user is the response time available from a TPM vendor. System availability, of which reponse time is a major and visible component to the user, is the most important factor in the user's satisfaction with their computer equipment. TPM vendors can exploit this decision factor if their geographic proximity and number of qualified engineers makes it

possible for the TPM vendor to provide better response times than the equipment vendor. Again, this highlights the importance of properly segmenting your market in order to provide adequate geographic coverage to targeted users.

- As previously mentioned, the ability of a TPM vendor to provide service on mixed-vendor hardware has slipped in importance to potential TPM customers. This is not to say that TPM vendors should not continue to move in this direction, since almost all equipment manufacturers are moving toward providing some level of support for foreign peripherals attached to their systems. But this has contributed to the lessening of this factor in choosing TPM over manufacturer-supplied support, since most manufacturers provide almost as much "single-source" maintenance as TPM vendors. It is for this reason that TPM vendors must continue to stress their ability to provide full maintenance services on multiple vendors at a user's site.

- Not surprisingly, software support is not very important as a selection criteria to TPM users, since only 26% of the TPM sample received any systems software support from their TPM vendors (see Exhibit V-1). This represents a future market with great potential, especially as operational productivity becomes dependent on software functionality.

- TPM vendors have traditionally associated themselves with two specific user markets--older equipment no longer being maintained (at a competitive price) by the vendor, and equipment located at remote locations that fall outside of the equipment manufacturer's service sphere. In both situations, users were expected to look at the lower priced TPM alternative. Manufacturers frequently priced maintenance of older equipment at such a level to encourage the user to replace the aged unit with an up-to-date model and also attached travel and zone charges to the maintenance pricing of remotely-located equipment. Both of these practices encouraged users to look at lower priced (and more responsive) maintenance alternatives.

- The responses of the 1985 user sample only partially support the above conclusions. We have already seen that users place minimal importance on geographic proximity and virtually no importance on choosing "the only service available."

- It is understandable that few users feel that their decision was based on the latter factor, since the TPM market has grown to such a degree that only in the most rare occasions is there a single possible service vendor available. Competition in the TPM market is fairly widespread, even in the support of older or obsolete equipment.

- What is surprising is the relative lack of concern about geographic proximity, considering the correlation between proximity and responsiveness. What this emphasizes is the importance that TPM users place on vendor reputation, most specifically in the area of quality hardware maintenance. Clearly, this highlights the importance of marketing the capabilities of the TPM service organization.

- On closer inspection, provided in Exhibit III-8, the demographic breakdown of the 1985 user sample demonstrates that TPM vendors service more older equipment than the manufacturers for all product categories. This is logical, since manufacturers concentrate on selling service contracts on new equipment while TPM vendors rarely get the opportunity to attract these new product users.

- Also, not surprisingly, TPM service vendors do not have as long as a service relationship with their customers as their manufacturer counterparts. TPM vendors become involved with users much later in the user's product's life, since the manufacturer usually controls the service of new products and since dissatisfied service customers of manufacturers will usually wait two or three years before switching over to TPM.

EXHIBIT III-8

TPM USER SAMPLE BY DEMOGRAPHIC BREAKDOWN

	AVERAGE AGE OF PRODUCT (Years)			AVERAGE LENGTH OF RELATIONSHIP (Years)			AVERAGE DISTANCE FROM SERVICE LOCATION (Miles)		
	Large System	Small System	Peripheral	Large System	Small System	Peripheral	Large System	Small System	Peripheral
Manufacturer-Supplied Service	3.2	2.9	3.7	8.9	5.8	4.1	4.9	15.6	18.9
TPM-Supplied Service	3.4	3.6	4.6	2.9	2.7	2.8	7.3	26.5	37.3

- The exhibit supports the relative lack of concern that users report for geographic proximity to their TPM service vendor, since the TPM users reports that they are anywhere up to twice as far away from their service vendor as their manufacturer-serviced counterparts. It is apparent that TPM users are swayed much more by a TPM vendor's reputation for quality service than by the potential responsiveness of closer TPM vendors.

C. TPM BUSINESS BASE

- In order to better segment the market, it is important to analyze the contractual requirements of TPM users in relation to their respective product market, since the contractual requirements of large systems users are vastly different, both in terms of amount of coverage and in the delivery of service.

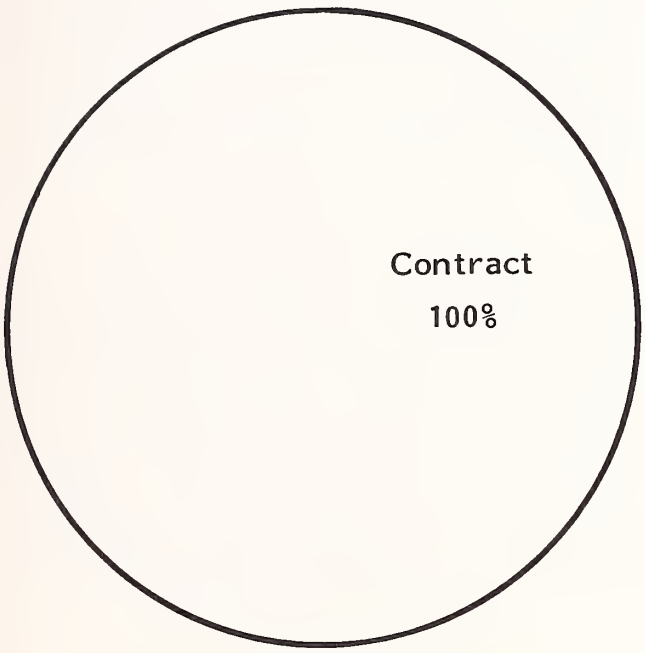
1. LARGE SYSTEMS TPM MARKET

- Exhibit III-9 demonstrates that, not surprisingly, the large sytems TPM user market is handled contractually versus on a T&M basis (our sample did not include IBM service reseller maintenance, which is usually handled as a service management contract using IBM per-call services). Large systems users, due to their understandably high service requirements, are most easily sold long-term service contracts, since service costs represent only a small fraction of the overall system purchase price and since the costs involved in completely replacing a mainframe computer system encourage users to maintain existing equipment for as long as possible.

- Logically, all TPM service for large systems is performed on-site, although hidden within this is a growing amount of large system hardware and software diagnostics that are performed through remote support services. Also, a small amount of service provided to TPM users is often perceived by users as on-site, even though in actuality the maintenance is performed at depot locations. "Man-in-the-van" support often falls in this category.

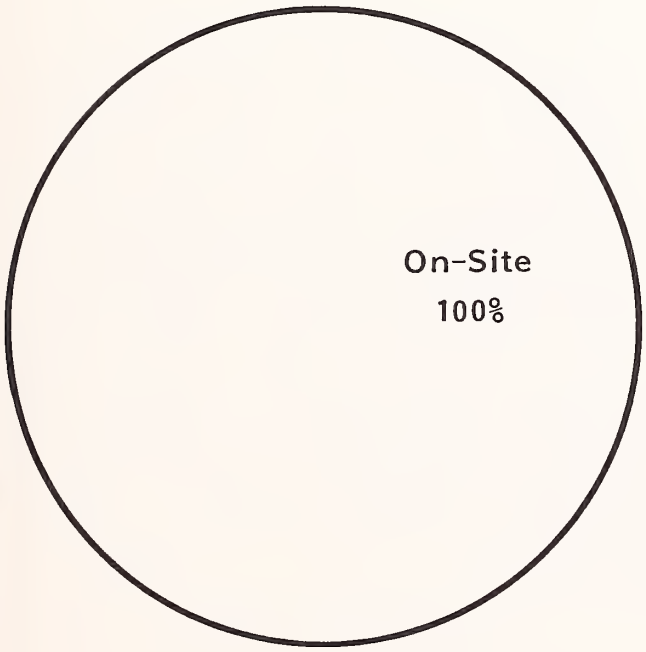
EXHIBIT III-9

TPM BUSINESS BASE - LARGE SYSTEMS



Contract versus T&M

DAYS COVERED	USE (Percent)
Monday-Friday	75%
Monday-Saturday	0
Monday-Sunday	25
HOURS COVERED	**USE (Percent)**
0 - 9	37%
10 - 16	37
17 - 24	26



On-Site versus Depot

DEPOT TYPE	USE (Percent)
Carry-In	0.0%
Mail-In	0.0
Courier	0.0

2. SMALL SYSTEMS TPM MARKET

- As shown in Exhibit III-10, the small systems market is predominantly serviced on a contractual basis, with 88% of our sample having purchased service contracts rather than relying on T&M or per-call maintenance. Again, the service requirements for small systems users, while not as high as mainframe users, are still high enough for a minicomputer or, to a greater extent, a superminicomputer user to opt for the long-term security of a service contract.

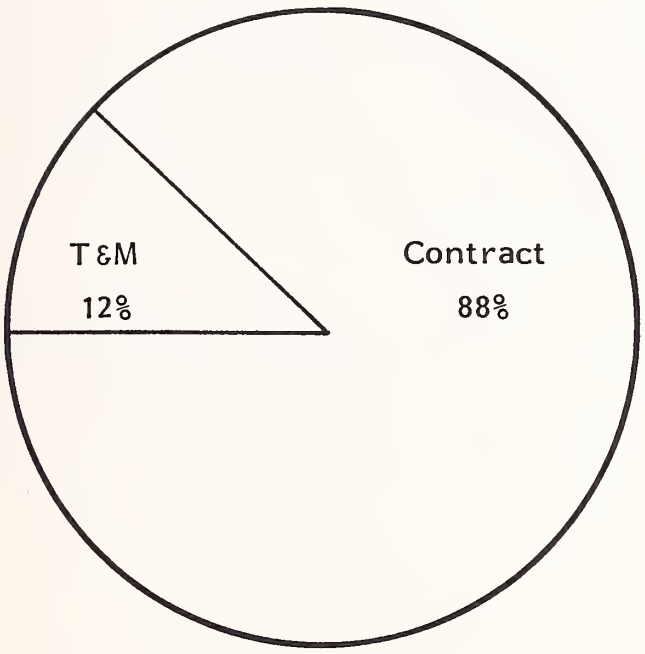
- As with large systems support, the predominant delivery method for small systems maintenance is on-site, although samples reflect the increased use of depot maintenance by small systems users over large systems users. To a greater extent than with large systems, a significant amount of courier-style depot maintenance is disguised as on-site maintenance. Also, a growing number of TPM vendors are incorporating remote diagnostics capabilities into their service offerings.

3. PERIPHERALS TPM MARKET

- Unlike large and small sytems users who almost always prefer the security of service contracts over TPM service, peripheral users demonstrate increased acceptance of per-call maintenance. While in many cases peripheral users require the same performance and system availability of their peripherals as they require for the system that the peripherals are attached to, in some situations, peripheral users, particularly terminal and printer users, have appreciatively lower uptime requirements for their equipment. Also, since the purchase price of some peripherals, such as terminals, is relatively low, certain peripheral users are price sensitive enough to gamble on the peripheral's reliability and opt for T&M service.

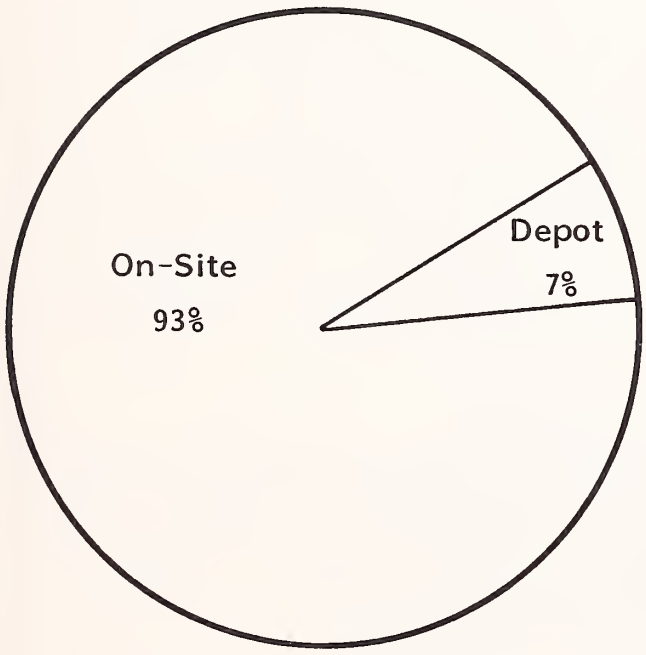
EXHIBIT III-10

TPM BUSINESS BASE - SMALL SYSTEMS



Contract versus T&M

DAYS COVERED	USE (Percent)
Monday-Friday	74%
Monday-Saturday	7
Monday-Sunday	19
HOURS COVERED	**USE (Percent)**
0 - 9	51%
10 - 16	26
17 - 24	23



On-Site versus Depot

DEPOT TYPE	USE (Percent)
Carry-In	33%
Mail-In	0
Courier	67

- The portability of certain peripherals also makes it attractive for cost-conscious users to rely on carry-in depot services, particularly for smaller terminal products. As shown in Exhibit III-11, 14% of the sample are experienced with depot service, with the majority of these users using carry-in service.

- The combination of low (purchase) cost and portability has allowed certain TPM vendors to offer exchange service on selected peripheral products. This frees the vendor from having to provide on-site responsiveness while still providing the user with minimal interruption of operations.

- A growing amount of peripheral maintenance is being performed by independent depots who provide the service either to other service organizations or, in some cases, directly to the end user. Often, these depots specialize in board diagnostics and refurbishments.

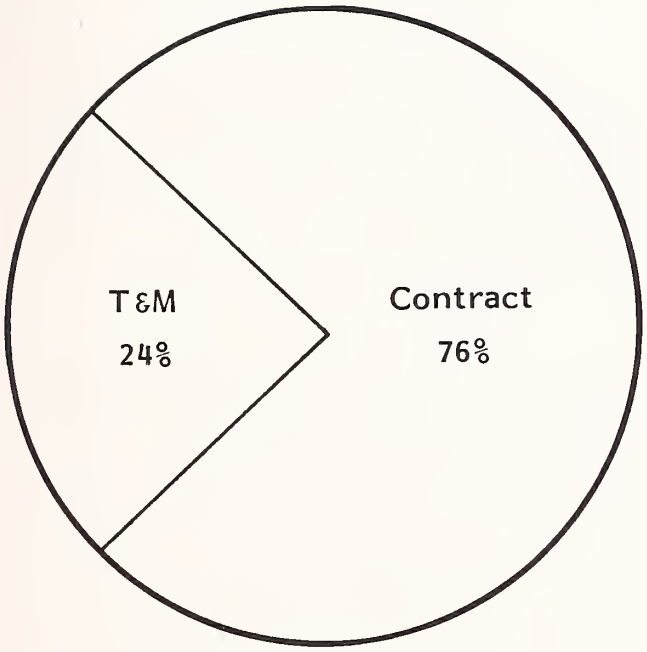
4. MICROCOMPUTERS TPM MARKET

- The microcomputer service market is undergoing a major transition, much of which results from the increased use of more sophisticated software applications, including multi-user, multi-tasking programs, local area networks, and micro-host connections. As microcomputers replace (at least functionally) small business systems and smaller traditional microcomputers, corporate users, including IS groups within the corporation, will require the same system availability and hence the same service performance that they received from the minicomputer systems vendors whose equipment the microcomputers replace.

- Thus, microcomputer users are requiring much more responsive and compelte service from their vendors. Equipment manufacturers are responding with more detailed service offerings, including on-site service contracts for hardware and telephone support numbers for software.

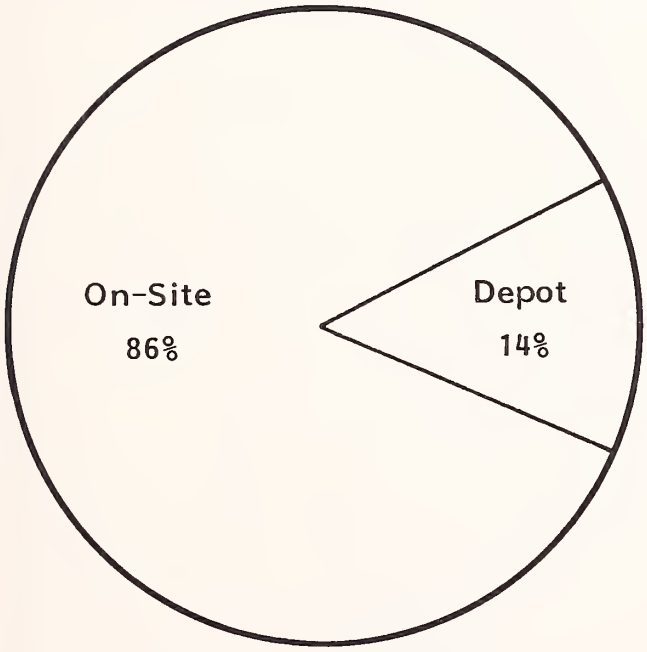
EXHIBIT III-11

TPM BUSINESS BASE - PERIPHERALS



Contract versus T&M

DAYS COVERED	USE (Percent)
Monday-Friday	90%
Monday-Saturday	0
Monday-Sunday	10
HOURS COVERED	**USE (Percent)**
0 - 9	80%
10 - 16	13
17 - 24	7



On-Site versus Depot

DEPOT TYPE	USE (Percent)
Carry-In	53%
Mail-In	7
Courier	40

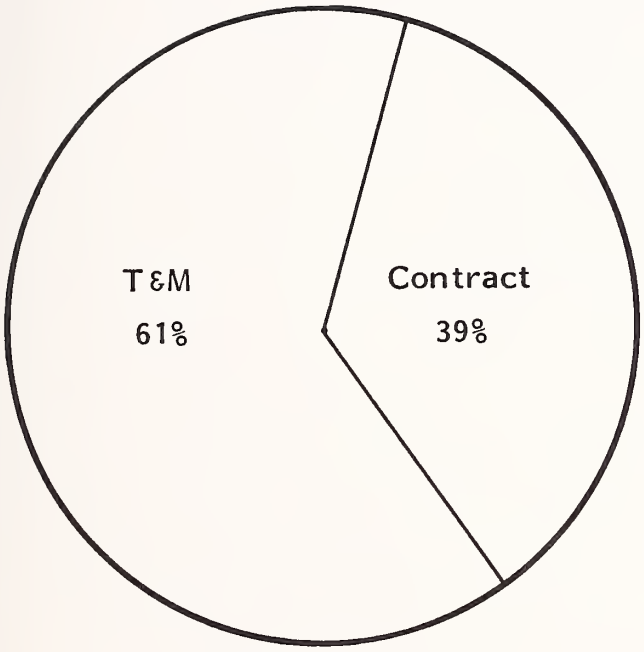
- TPM vendors will also increase their service offerings in order to continue to satisfy their existing users and stave off the service "assault" by manufacturers. Although Exhibit III-12 shows that a majority of microcomputer users receive their maintenance on a time and material (or per-call) basis, the number of users who will choose the security of a service contract is definitely on the rise.

- Increased service requirements of corporate microcomputer users will also result in the increased selection of on-site service as a delivery method, since increased system availability requirements will necessitate the response times available only through on-site maintenance.

- The results of this transition will be a further segmentation of the market. Large corporate users of advanced multi-user systems, such as IBM ATs, LANs and micro-host applications, will require on-site maintenance and support, with response times of less than the current next day best effort. Single-user microcomputer users will require a less timely response, either next day on-site service or perhaps even same-week depot service. Service vendors will need to provide service offerings that will satisfy these requirements in order to increase user satisfaction, further service coverage, and ultimately maximize service profitability.

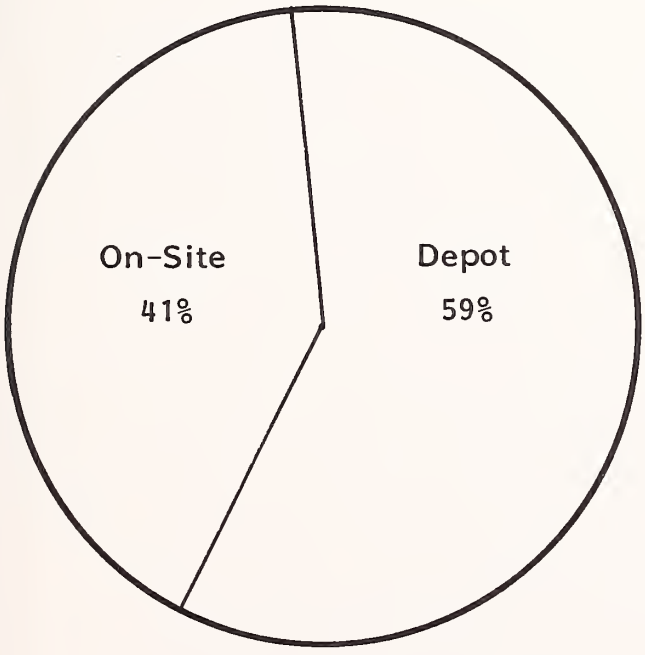
EXHIBIT III-12

TPM BUSINESS BASE - MICROCOMPUTERS



Contract versus T&M

DAYS COVERED	USE (Percent)
Monday-Friday	100%
Monday-Saturday	0
Monday-Sunday	0
HOURS COVERED	**USE (Percent)**
0 - 9	85%
10 - 16	15
17 - 24	0



On-Site versus Depot

DEPOT TYPE	USE (Percent)
Carry-In	65%
Mail-In	0
Courier	35

IV THIRD-PARTY MAINTENANCE VENDOR PERFORMANCE

IV THIRD-PARTY MAINTENANCE VENDOR PERFORMANCE

A. INTRODUCTION

- In the following chapter, third-party maintenance service performance will be analyzed and compared to manufacturer performance in the respective product categories that both serve. Each will be judged by the quality of service provided to users in all areas, including hardware maintenance, software support, responsiveness and timeliness of repairs, and completeness of the entire spectrum of post-sales support as defined by present and future user requirements.

- A number of factors can affect TPM user satisfaction with service received. First, the largest number of TPM users have chosen TPM service over available manufacturer-supplied service, usually out of dissatisfaction with their previous service. Those users have a comparatively high service requirement level, since they have experienced, and already expressed dissatisfaction with, manufacturer-supplied maintenance.

- Second, a large number of TPM users have selected TPM out of necessity, due to a lack of manufacturer-supplied service. Since there is less competition for their service dollar, particularly from the manufacturer, these users will have relatively lower service requirements from their service vendors.

B. TPM USER SATISFACTION WITH SERVICE

- On the whole, TPM users express relatively high satisfaction levels in comparison to their manufacturer-supplied counterparts. This is not surprising given the importance that users place on the quality of service received over other purchase decision factors, including price of service and geographic proximity (which would affect speed of service).

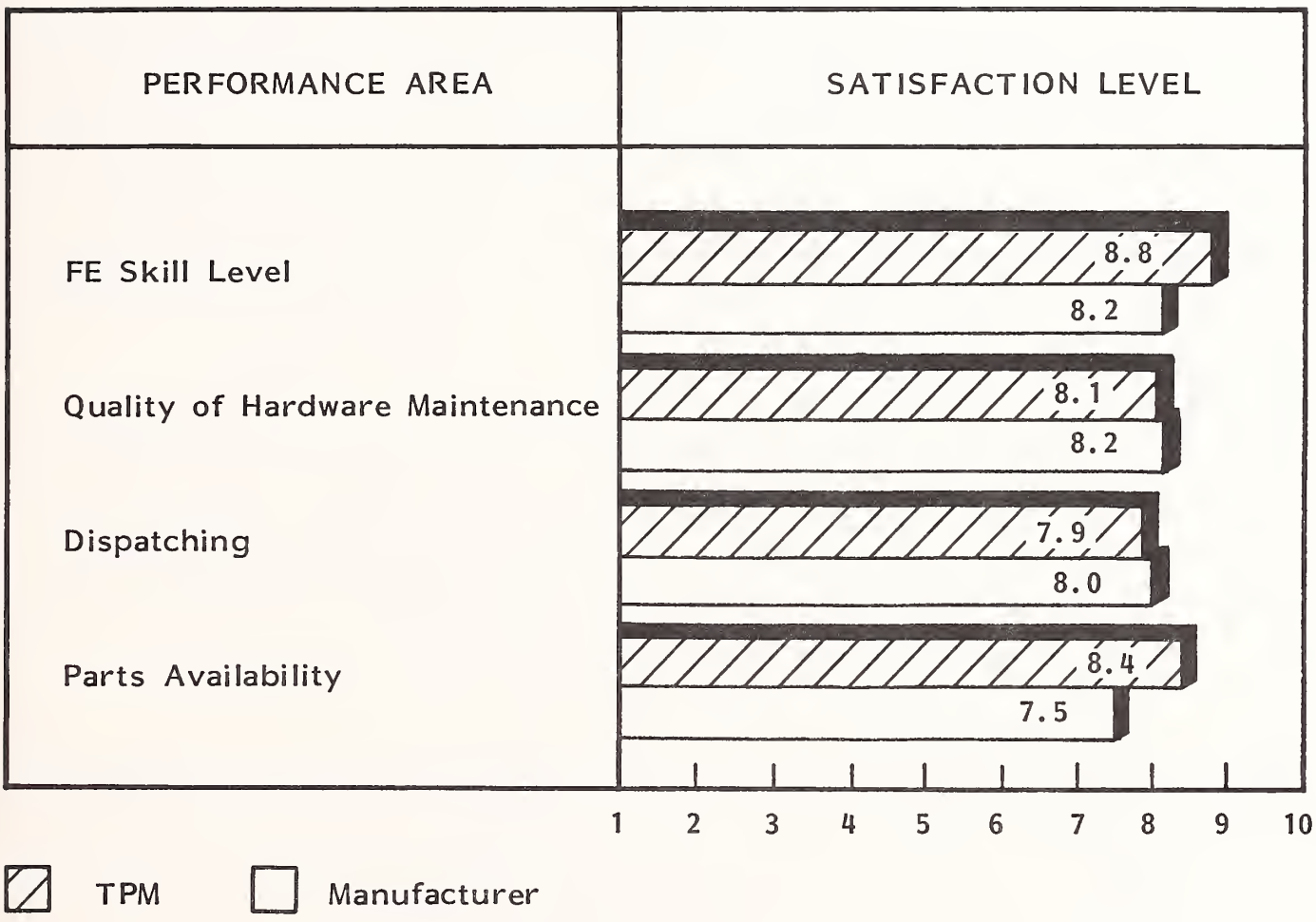
- Exhibit IV-1 provides a comparison of large system TPM user satisfaction with selected key service performance areas versus users who received their maintenance from large system manufacturers. The results reflected the maturity of the large systems TPM market, since the user satisfaction levels for the most part mirrored the levels reported by users of the manufacturers, most notably in the area of dispatching where one might expect the manufacturers to have an advantage in resources available to set up and manage an extensive dispatching system.

- It should be noted that the TPM vendors who typically perform service on large systems are usually large enough to have automated their dispatching, escalation, and parts tracking systems. The largest of these firms, TRW, Sorbus, and CDC, who between them account for over 60% of the mainframe and superminicomputer markets, all have regional dispatching and inventory systems that rival those systems used by manufacturers.

- Large system TPM users reported significantly higher satisfaction levels in the key areas of FE skill level and parts availability. These two service areas are a continual concern voiced by computer users who, quite correctly, equate slower response and repair times to problems in these areas. The high satisfaction marks reported by large system TPM users reflect the success of certain TPM vendors in attracting qualified engineers and in acquiring and maintaining sufficient spare parts inventory.

EXHIBIT IV-1

TPM VERSUS MANUFACTURER USER SATISFACTION WITH SERVICE
LARGE SYSTEMS



Rating: 1 = Low, 10 = High

- According to Exhibit IV-2, small systems TPM users report service satisfaction levels that, if anything, are higher than those reported by their large systems TPM user counterparts. Most notable is the huge disparity in the area of overall quality of hardware maintenance. This high satisfaction level, compared to the responses of small systems users who receive their maintenance from the manufacturers, helps explain the tremendous growth in TPM use expected in the small systems markets.

- As was the case with large system TPM users, there is a surprisingly large gap in user satisfaction with parts availability between small systems users who receive their service from TPM vendors versus those who receive their service from manufacturers. Again, these high satisfaction levels are weighted by those responses from larger TPM vendors who can rely on long-term guaranteed contracts as a constant source of spares, supplemented in some situations by parts supplied by their users.

- Manufacturers of large and small systems should be concerned with TPM user satisfaction with parts availability, especially in light of the results of INPUT's user requirements reports in these areas, which demonstrates that 45% of the small systems users and only 38% of the large systems users were satisfied with their vendor's performance in this area.

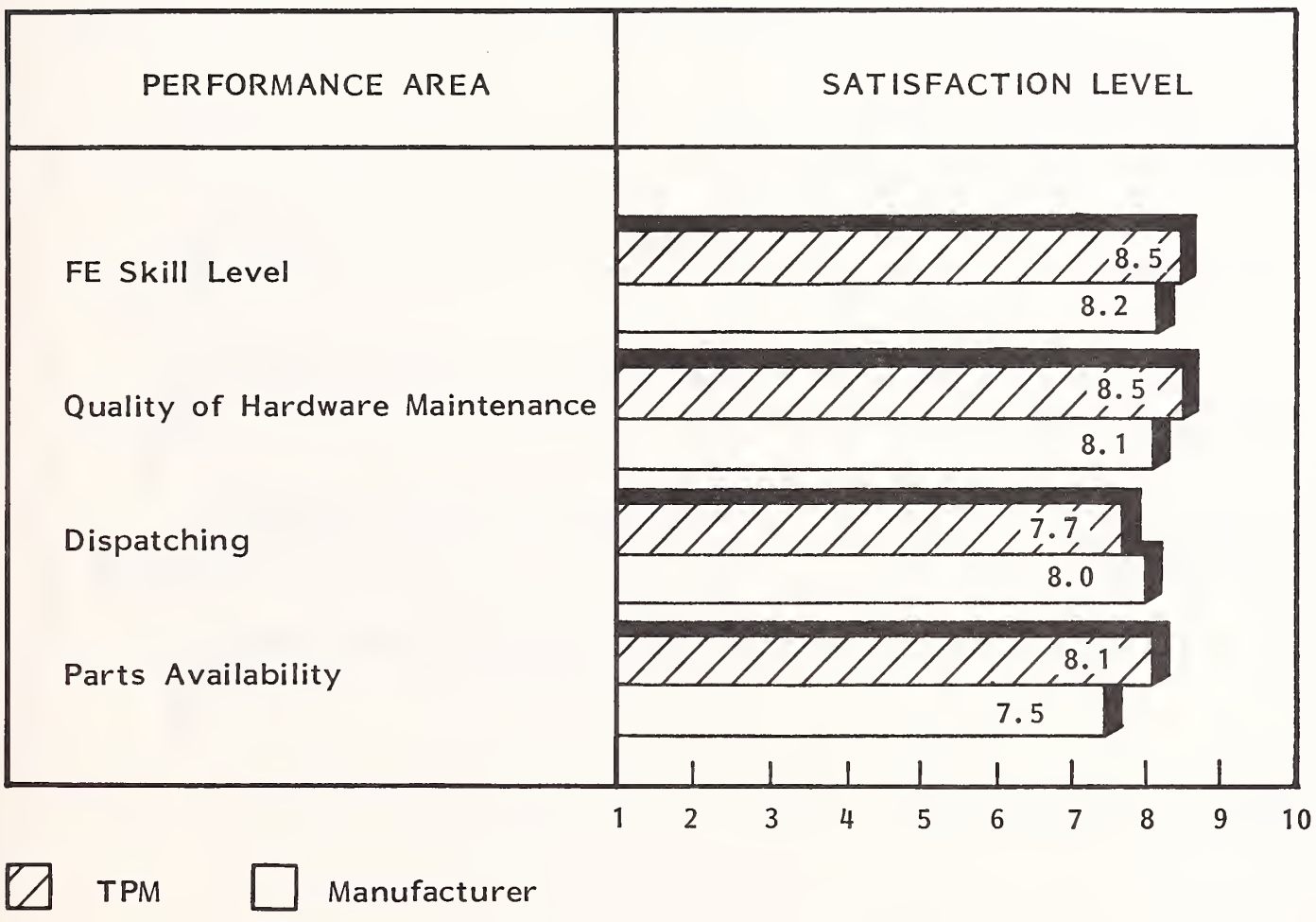
- Exhibit IV-3 demonstrates that TPM vendors who service peripheral users do not fare as well as those who service computer systems, since TPM users reported lower satisfaction areas in all five selected areas of service than the users who relied on manufacturer service, including much lower satisfaction levels in the area of dispatching, which should be considered an area of weakness by peripheral TPM users (as shown later in this chapter).

- An underlying reason for the lower satisfaction levels reported by peripheral users who use TPM service is the large number of smaller TPM vendors who have entered the peripherals segment of the TPM business. Many of these smaller firms cannot compete for either the limited number of qualified field

EXHIBIT IV-2

TPM VERSUS MANUFACTURER USER SATISFACTION WITH SERVICE

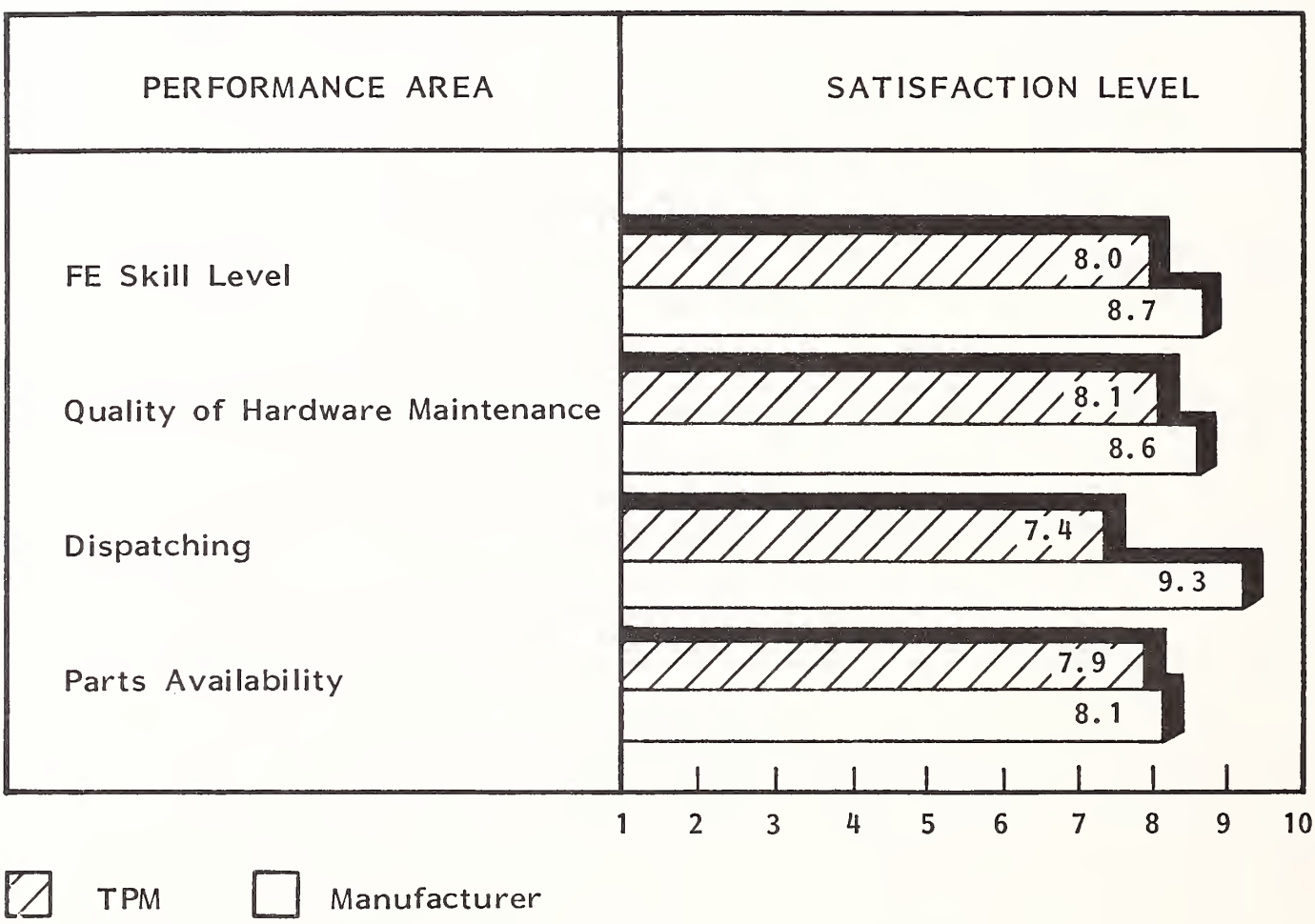
SMALL SYSTEMS



Rating: 1 = Low, 10 = High

EXHIBIT IV-3

TPM VERSUS MANUFACTURER USER SATISFACTION WITH SERVICE PERIPHERALS



Rating: 1 = Low, 10 = High

engineers or the resources to effectively set up an automated dispatching, escalation, and inventory management system. The peripherals segment of the TPM market attracted a number of smaller TPM companies who have overextended their resource base in their attempt to enter the peripherals service market. Many of these companies do not have automated service management capabilities, and if they do have an automated system, in most cases it is centrally located and controlled due to lowered costs inherent in this setup.

- It is difficult to compare manufacturer/vendor performance with TPM/vendor performance in the microcomputer market, since so many microcomputer users identify the manufacturer as the service source, even though a dealer or TPM vendor actually provides the service. However, these users, as indicated in Exhibit IV-4, are generally happy to receive any level of service. As a result, these users report relatively high levels of satisfaction.

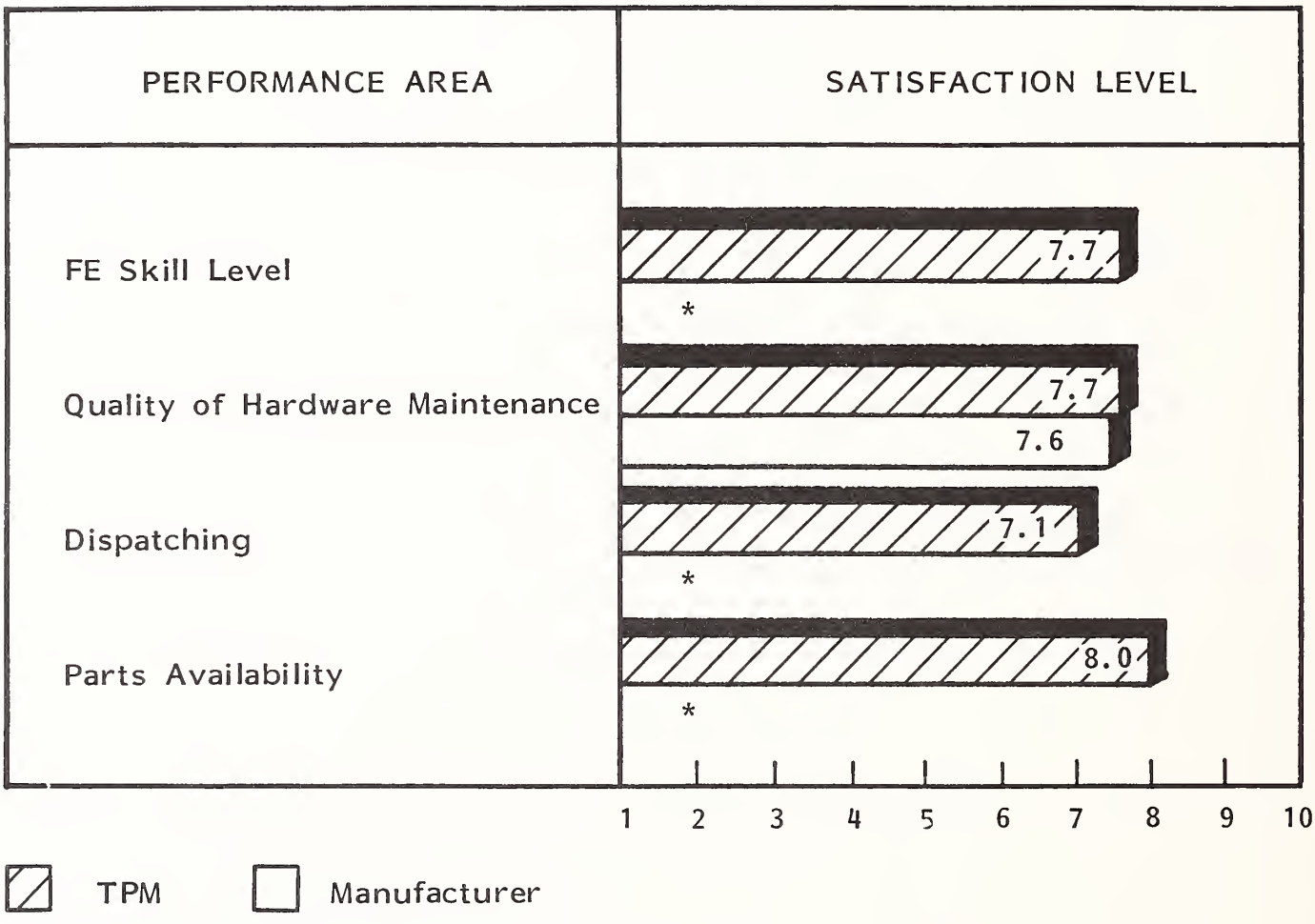
- Since system availability is ranked highest as a purchase/decision factor in all categories of computer equipment, TPM vendor performance in the areas of response and repair times warrants closer examination. It is necessary to delineate the discrepancy between the user's definition of response and repair times and the vendor's traditional definition, since it is the user's perception of performance that drives user satisfaction with service.

- Traditionally, TPM vendors and, in fact, all service vendors have defined response time as the amount of time required to arrive on-site (in response to a user's call) from the point in time that the user contacts the vendor. Users, on the other hand, view response time as the time necessary for the vendor to respond on-site from the moment the equipment's failure is detected.

- Similarly, vendors define repair time as the amount of time necessary to effect repairs, usually starting the moment the FE diagnoses the problem to the point of time when the problem is resolved. Users, for the most part, agree with this definition. However, a significant contribution to overall

EXHIBIT IV-4

TPM VERSUS MANUFACTURER USER SATISFACTION WITH SERVICE
MICROCOMPUTERS



Rating: 1 = Low, 10 = High

* Not Available

system downtime is ignored by these definitions, since a considerable amount of time is required in restoring the system to full operational functionality. This "recovery time" is almost completely out of the control of the TPM vendor who, unlike a manufacturer, has no control over reliability of the product or increased use of diagnostics designed into the system. Instead, the TPM vendors can only strive to improve response and actual repair times in order to lessen the impact of system recovery time.

- TPM vendor responsiveness can be measured two ways: first, in direct comparison against the manufacturers that they compete against; and second, and most importantly, against the response and repair time requirements of their own particular users.

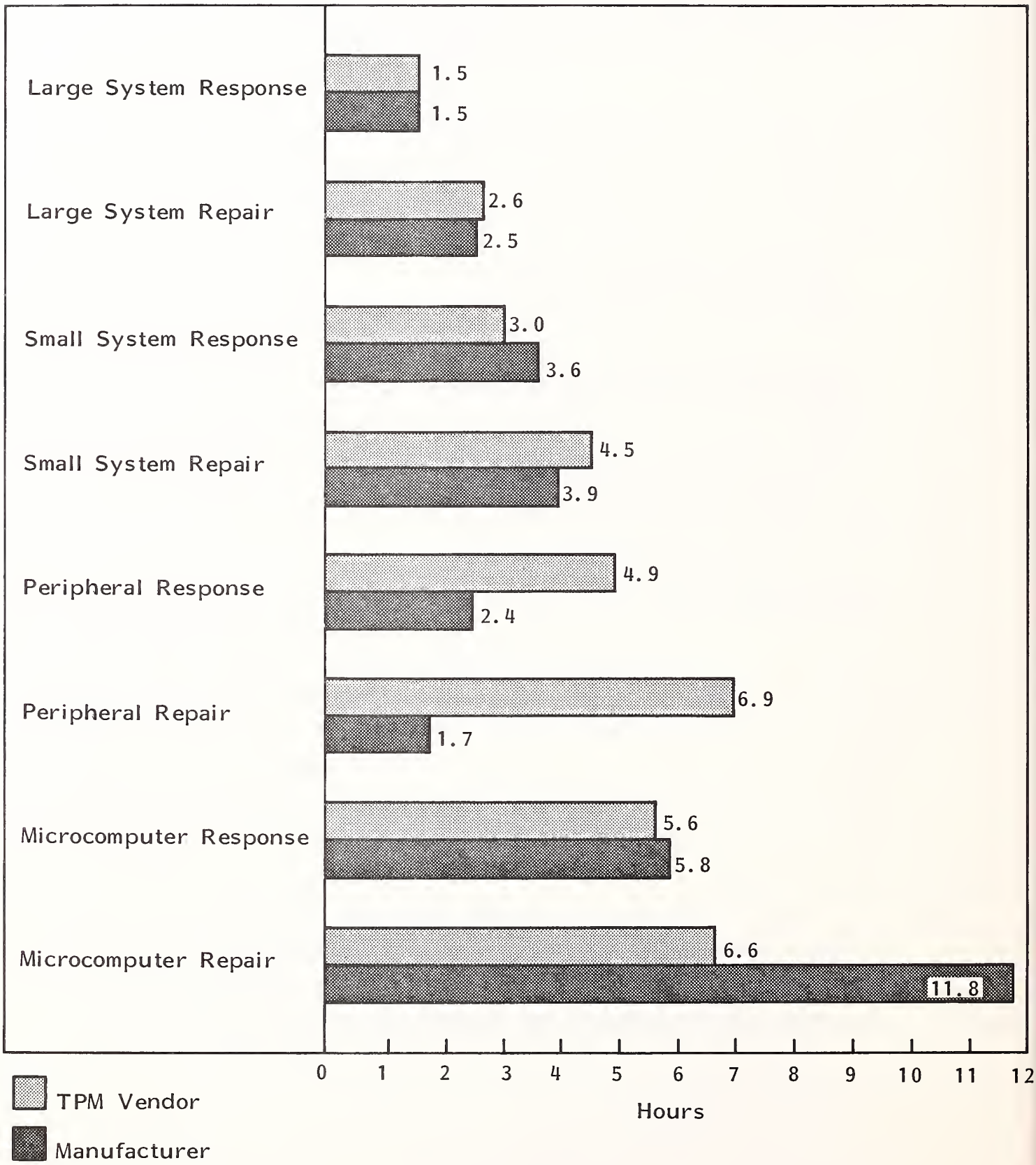
- Exhibit IV-5 shows that when TPM vendors are compared with their manufacturing counterparts, it is apparent there is little significant difference in response or repair times between TPM vendors who maintain large or small systems and manufacturers of these sytems who service their own users. This similarity in vendor responsiveness is a direct result of the clear definitions of large and small systems user requirements for system availability and, as a result, vendor response and repair times.

- In addition, most TPM vendors that concentrate on large and small systems usually fall into two categories--large, national TPM firms like TRW or Sorbus that have well established dispatching, parts distribution, and engineer recruiting and training capabilities; and smaller, independent TPM vendors, such as Pacific Computer Systems, that have carefully and successfully focused their service market along specific product lines and specific demographic characteristics.

- In the peripherals market, on the other hand, there is a dramatic discrepancy between TPM performance in response and repair times and manufacturer performance. As shown in the exhibit, peripheral users who receive their service from TPM vendors report response times that are twice as long as

EXHIBIT IV-5

TPM VERSUS MANUFACTURER SERVICE RESPONSE AND REPAIR TIMES



users who receive their service from the manufacturer, and repair times almost four times longer.

- There may be many reasons why there is such a discrepancy in response and repair time reported by peripheral users who receive their support from TPM vendors versus those who receive their support from manufacturers. First, the peripheral product mix for a TPM vendor is much more diverse than that of a manufacturer. A TPM vendor might have to support peripheral products from small peripheral manufacturers (who often do not have their own service capabilities), where a manufacturer most often services only his own equipment. This puts a more critical burden on the TPM vendor in the logistics of parts acquisition, inventory control and delivery, documentation, and training.

- TPM vendors also face the burden of supporting a product base that, unlike a manufacturer, they have little control over. Product dispersal, particularly in the peripherals market where a number of smaller manufacturers compete for market share, can cause a TPM vendor to overextend his ability to provide responsive service to his existing customer base. A manufacturer, on the other hand, can condition a remote user at the time of purchase to the effect of the user's remote location to the responsiveness of service available.

- Repair times for TPM service of peripheral equipment is also affected by the age of the products being serviced. TPM vendors frequently assume the maintenance responsibilities of older equipment where the manufacturers have either increased maintenance prices to high levels or, in some cases, discontinued service altogether. Older peripheral devices do not have the self-diagnostics or other features that make current peripheral devices more serviceable. Therefore, a TPM vendor servicing older equipment will have longer repair times than a peripherals manufacturer providing service on current equipment.

- One should not assume that TPM vendors in general do not provide as responsive a service as manufacturers in the peripherals market. In many cases,

TPM vendors can provide faster service, especially if the TPM vendor has a service location at a closer proximity to a given user's site. What should be noted is the importance of product mix in service performance.

- A product market where TPM vendors have built up a tremendous advantage over their manufacturer counterparts is the business-use microcomputer market. Historically, third-party maintenance companies, along with retail dealer and distributors, provide the vast majority of service and support of microcomputers, with the bulk of any on-site maintenance coming from TPM vendors. Slowly, manufacturers are gaining control over the service and support of their own equipment, mainly through the increased activity by IBM in supporting PC users.

- At the beginning of this increased activity by manufacturers in servicing their micro users, the majority of all service was provided on a depot basis, either carry-in, mail-in, or courier maintenance. Manufacturers, such as DEC, HP, and to a limited extent IBM, offered on-site maintenance, but due to limited market share (in the case of DEC and HP) or the relatively high cost of the on-site maintenance being offered, the majority of manufacturer-supplied microcomputer maintenance was provided through depot offerings.

- In the meantime, attracted by the service revenue potential resulting from the explosive growth in microcomputer sales and encouraged by the lack of activity by microcomputer manufacturers in the micro-maintenance market, third-party maintenance companies quickly entered the microcomputer maintenance market, offering responsive on-site and depot service to this rapidly growing marketplace. Certain large TPM firms, such as TRW, Sorbus, and RCA, offered extensive service capabilities to business users of micros, particularly on-site service. RCA, in fact, became virtually the sole source of on-site maintenance for corporate users of Apple microcomputers. In addition, smaller TPM companies focused exclusively on providing responsive support for microcomputers.

- Currently, manufacturers are demonstrating an increasing desire to provide direct service and support to larger corporate users, as demonstrated by recent announcements by IBM on significant service discounts for large quantity users. Increased manufacturer involvement in the microcomputer maintenance market will improve overall responsiveness through increased competition, if for no other reason. More significantly, manufacturers will provide clearly delineated service pricing structures along product lines as large corporate use of more advanced, multi-user systems requires increasingly responsive, on-site maintenance of microcomputers.

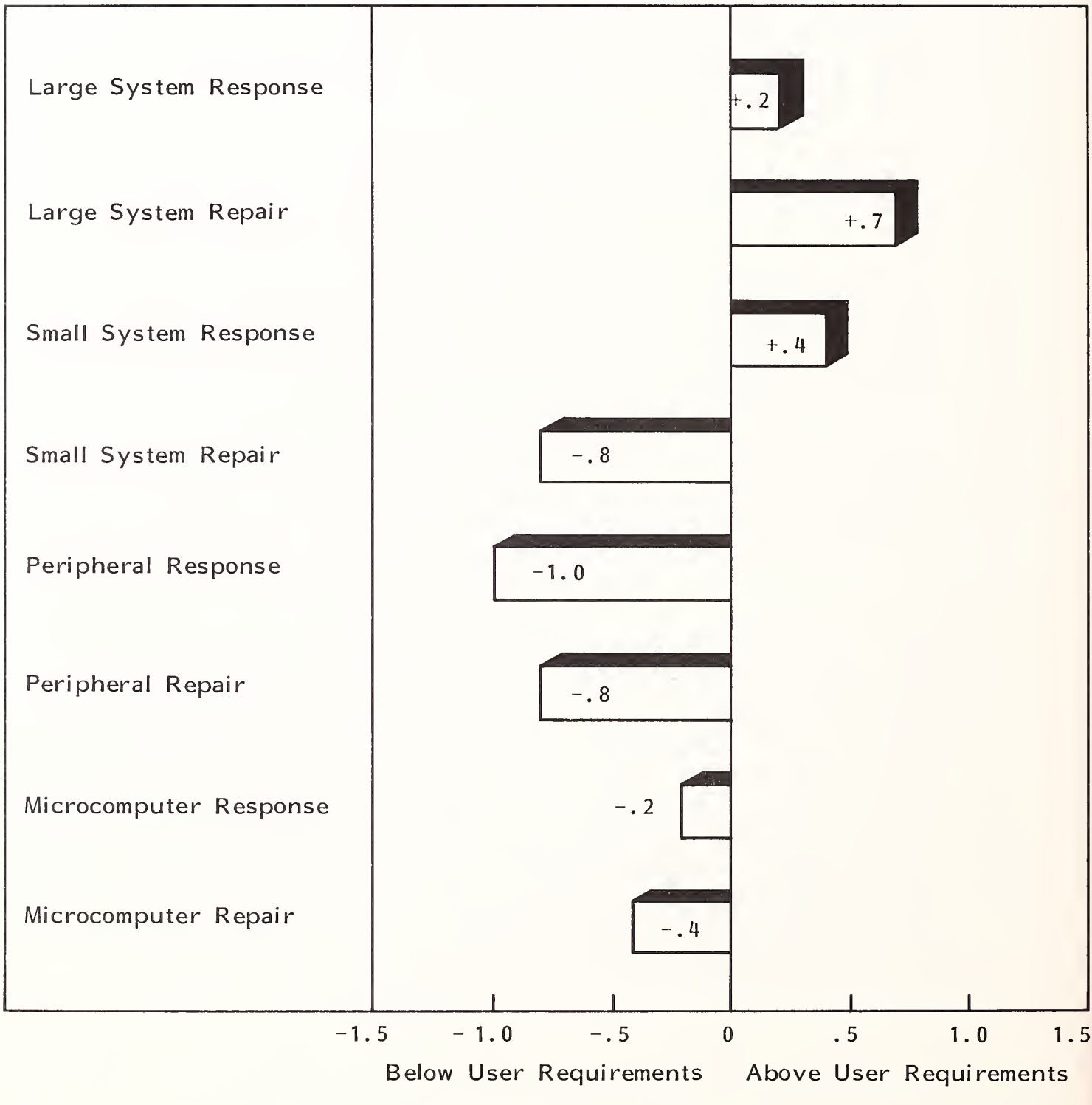
- TPM vendor responsiveness, as measured by response and repair times compared to the corresponding performance by equipment manufacturers' service organizations, is one measurement of TPM vendor performance. A better test of TPM vendor performance would be a comparison of TPM user requirements versus the actual performance by the vendors. Exhibit IV-6 demonstrates TPM vendor response and repair times versus user requirements, broken down by product type.

- Not surprisingly, large systems users report that response and repair times are satisfactory, actually exceeding their requirements. Small systems users also report that TPM vendor responsiveness is satisfactory; however, TPM repair time, at 4.5 hours (see Exhibit IV-5), is 0.8 hours too long.

- TPM vendor responsiveness in the peripherals market, on the other hand, is considerably below user expectations, with both response and repair times almost an hour each over user requirements. As discussed previously, TPM vendors may be overextending their capabilities in servicing too broad of a geographic or product coverage. This user dissatisfaction with TPM vendor responsiveness is supported by Exhibit IV-6, in which peripheral users give TPM vendors much lower subjective marks in the area of dispatching than their equipment manufacturer counterparts.

EXHIBIT IV-6

TPM USER RESPONSE AND REPAIR REQUIREMENTS VERSUS ACTUALS



- Microcomputer users who receive their service from TPM vendors report response and repair time actuals that are fairly close to their requirements. This should make it difficult for microcomputer manufacturers to attract existing TPM users without providing improved response and repair times, or without providing a much more competitive service price.

C. TPM USER SATISFACTION WITH POST-SALES SUPPORT

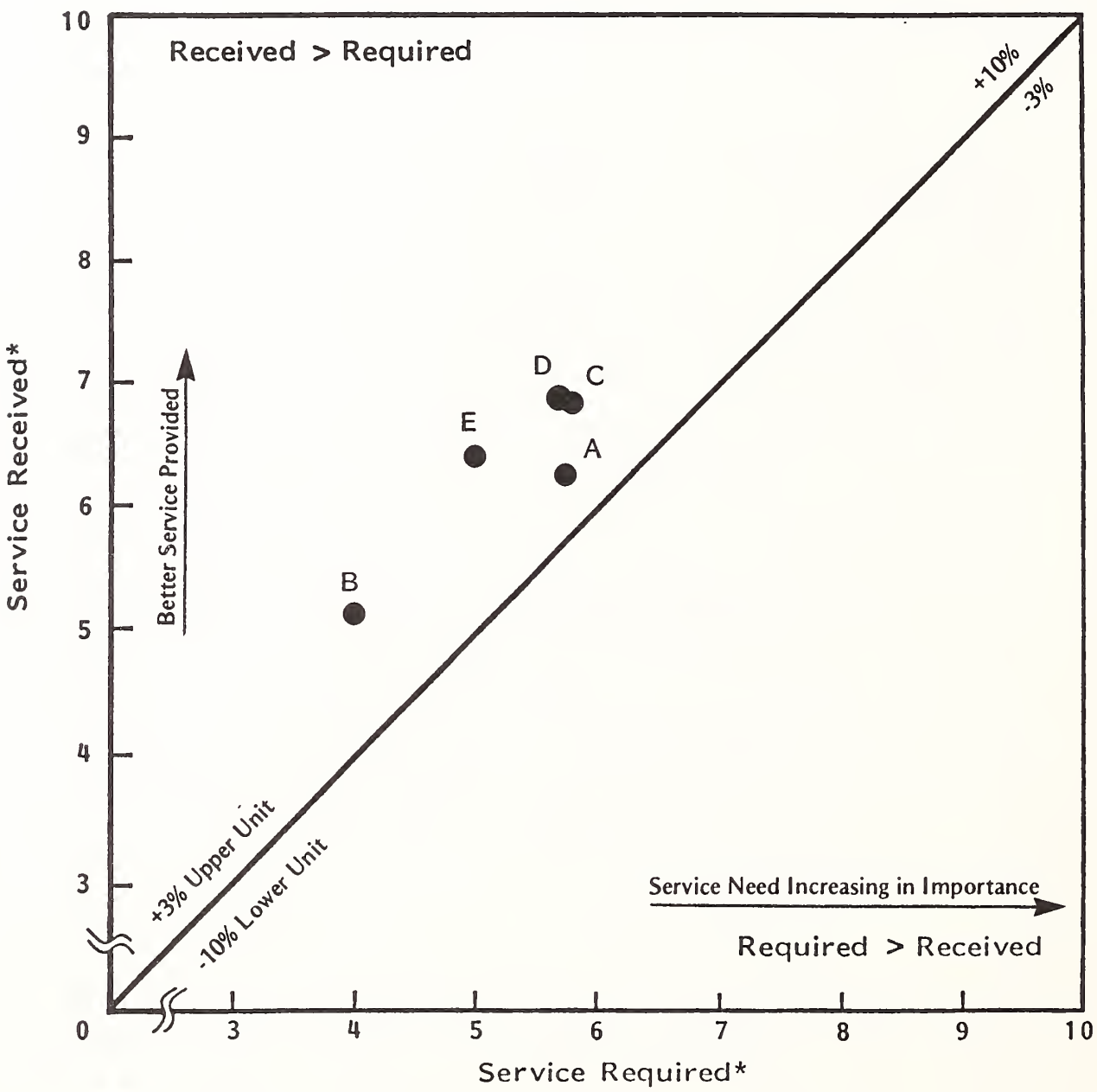
- A traditional advantage that manufacturer service organizations could market over third-party maintenance organizations were usually in the post-sales support area--services above and beyond remedial maintenance activities. Just as manufacturer service organizations recognized the strategic importance of professional services, such as consulting, planning, and sales support, and education services, such as training and documentation support, most TPM vendors are increasing and improving their own offerings in these areas.

- The TPM user reaction to this increased activity in post-sales support services is a positive one (see Exhibit IV-7). Not incidentally, TPM vendors who performed well in such support areas as consulting, training, and documentation support receive the highest overall service satisfaction marks from their users, most visibly in the large systems market. While user requirements for these services are relatively low in comparison to actual hardware maintenance activities (shown in Exhibits IV-8 through IV-11), there appears to be a direct correlation between TPM vendors who receive high marks in these areas and in overall user satisfaction.

- Exhibit IV-12 demonstrates the extremely high satisfaction marks given TPM vendors in the large systems market in comparison to the required versus received marks reported by users of large systems manufacturer-supplied service. This exhibit does not show that TPM vendors provide superior service in these areas. Since TPM users reported relatively low requirements for

EXHIBIT IV-7

USER SATISFACTION WITH POST-SALE SUPPORT REQUIRED/RECEIVED
PRODUCT: ALL



● TPM User Response

A = Consulting
B = Training
C = Documentation
D = Add On/Supplies Sales
E = Relocation/Deinstallation

*Rating: 1 = Low, 10 = High

EXHIBIT IV-8

1985 TPM POST-SALE SUPPORT
REQUIREMENTS VERSUS RECEIVED
PRODUCT: ALL

POST-SALE SUPPORT AREA	REQUIREMENT*	RECEIVED*	SATISFIED WITH LEVEL (Percent)
Documentation	5.8	6.8	70%
Add-on/Supplies Sales	5.3	6.2	73
Consulting	5.1	6.4	81
Relocations/Deinstallations	5.0	6.4	79
Training	4.0	5.1	68

Rating: 1 = Low, 10 = High

EXHIBIT IV-9

TPM POST-SALE SUPPORT PERFORMANCE VERSUS MANUFACTURERS' PRODUCT: LARGE SYSTEMS

SERVICE	REQUIREMENT		RECEIVED	
	Manufacturer	TPM	Manufacturer	TPM
Consulting	6.3	2.6	7.0	7.3
Training	6.5	3.0	7.1	7.1
Documentation	7.1	2.1	7.3	7.1

EXHIBIT IV-10

TPM POST-SALE SUPPORT PERFORMANCE VERSUS MANUFACTURERS'
PRODUCT: SMALL SYSTEMS

SERVICE	REQUIREMENT		RECEIVED	
	Manufacturer	TPM	Manufacturer	TPM
Consulting	6.7	5.6	6.9	6.3
Training	6.2	4.4	6.4	5.2
Documentation	7.1	6.8	6.9	7.2

EXHIBIT IV-11

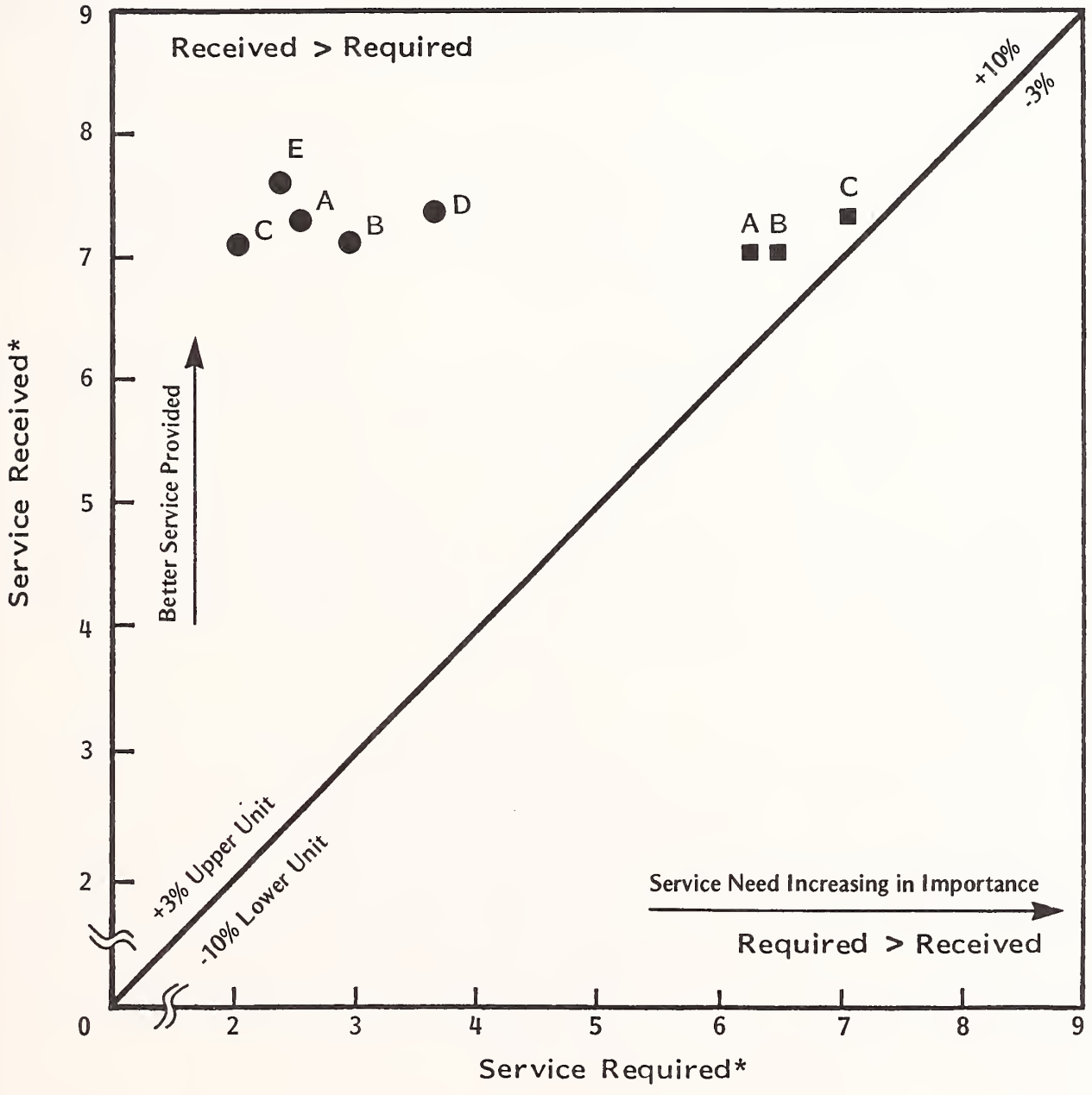
TPM POST-SALE SUPPORT VERSUS MANUFACTURERS'

PRODUCT: PERIPHERALS

SERVICE	REQUIREMENT		RECEIVED	
	Manufacturer	TPM	Manufacturer	TPM
Consulting	5.8	4.9	6.9	6.7
Training	6.6	3.7	6.3	5.6
Documentation	7.5	5.4	7.6	7.0

EXHIBIT IV-12

USER SATISFACTION WITH POST-SALE SUPPORT REQUIRED/RECEIVED
PRODUCT: LARGE SYSTEMS



● TPM Large System User Response
■ MFR Large System User Response

A = Consulting
B = Training
C = Documentation
D = Add On/Supplies Sales
E = Relocation/Deinstallation

*Rating: 1 = Low, 10 = High

these services, whatever service provided by TPM vendors is seen as a bonus by the users, with the high satisfaction ratings as a result.

- What is shown by the exhibit is the higher value that manufacturer-supplied users place on these services.

- Small systems users who receive their service from TPM vendors demonstrate higher requirements for such support activities as consulting, training, and planning. This is a result of many factors.

  - TPM penetration into this market is much greater than in the mainframe market, both as a result of operator user loyalty to the manufacturer in the mainframe market and by the increased likelihood of mixed shops in the minicomputer market.

  - As a result, greater TPM experience in the small systems market has increased competition and service offerings.

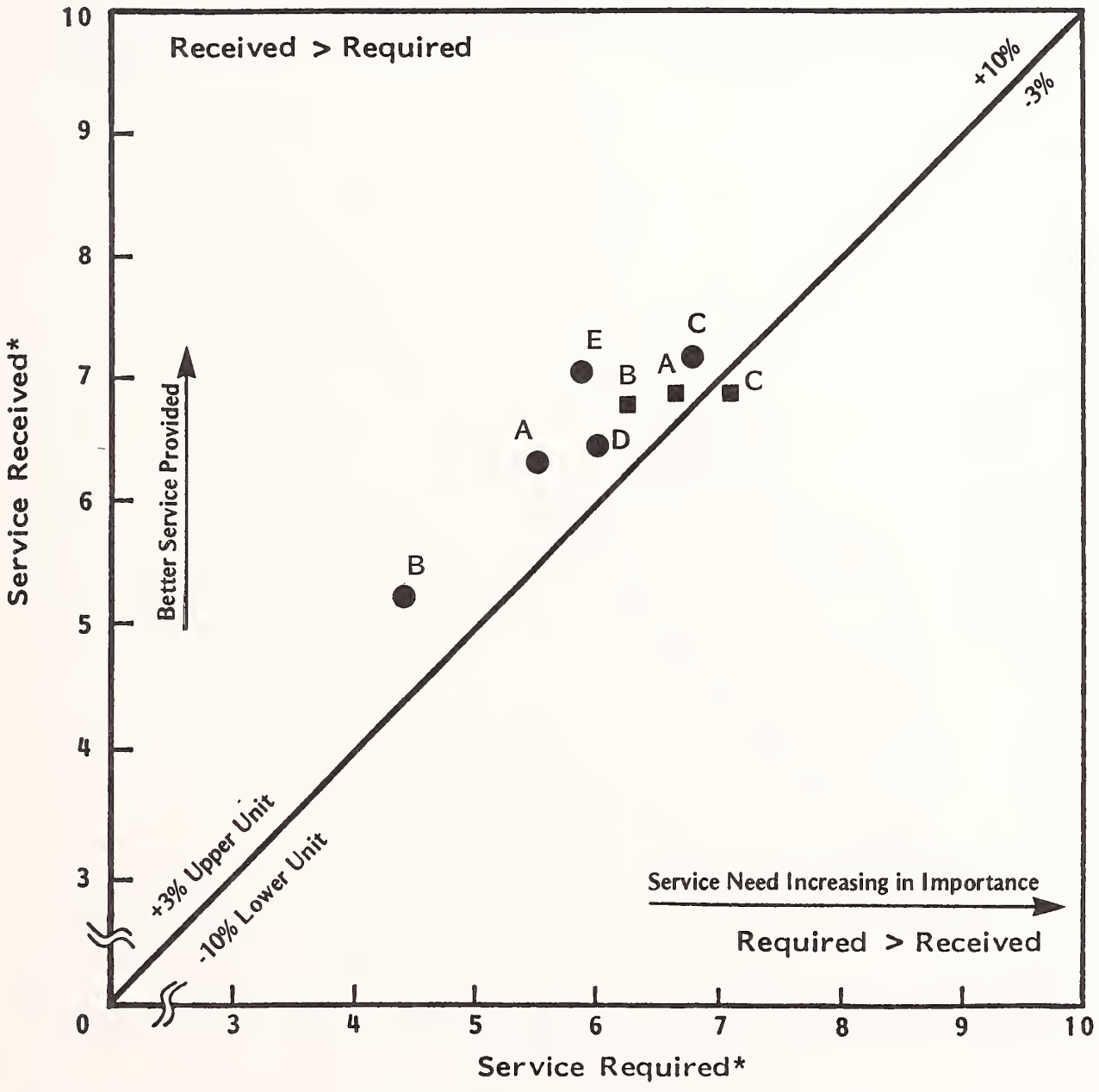
- Exhibit IV-13 shows the increased requirements that small systems TPM users report for additional support services. Note the similarity between vendor performance in both manufacturer-supplied and TPM-supplied service in the small systems market.

- Users of peripherals who receive their maintenance and support from TPM vendors also have a higher requirement for professional and educational services than large systems vendors, as shown in Exhibit IV-14. But just as these users expressed dissatisfaction with the traditional remedial maintenance activities of their TPM vendors, they expressed slightly lower satisfaction rates for the additional support offerings in consulting, training, and documentation support.

- Significantly, an area of opportunity highlighted in Exhibit IV-15 for service improvement in the TPM microcomputer market is in areas of consulting,

EXHIBIT IV-13

USER SATISFACTION WITH POST-SALE SUPPORT REQUIRED/RECEIVED
PRODUCT: SMALL SYSTEMS



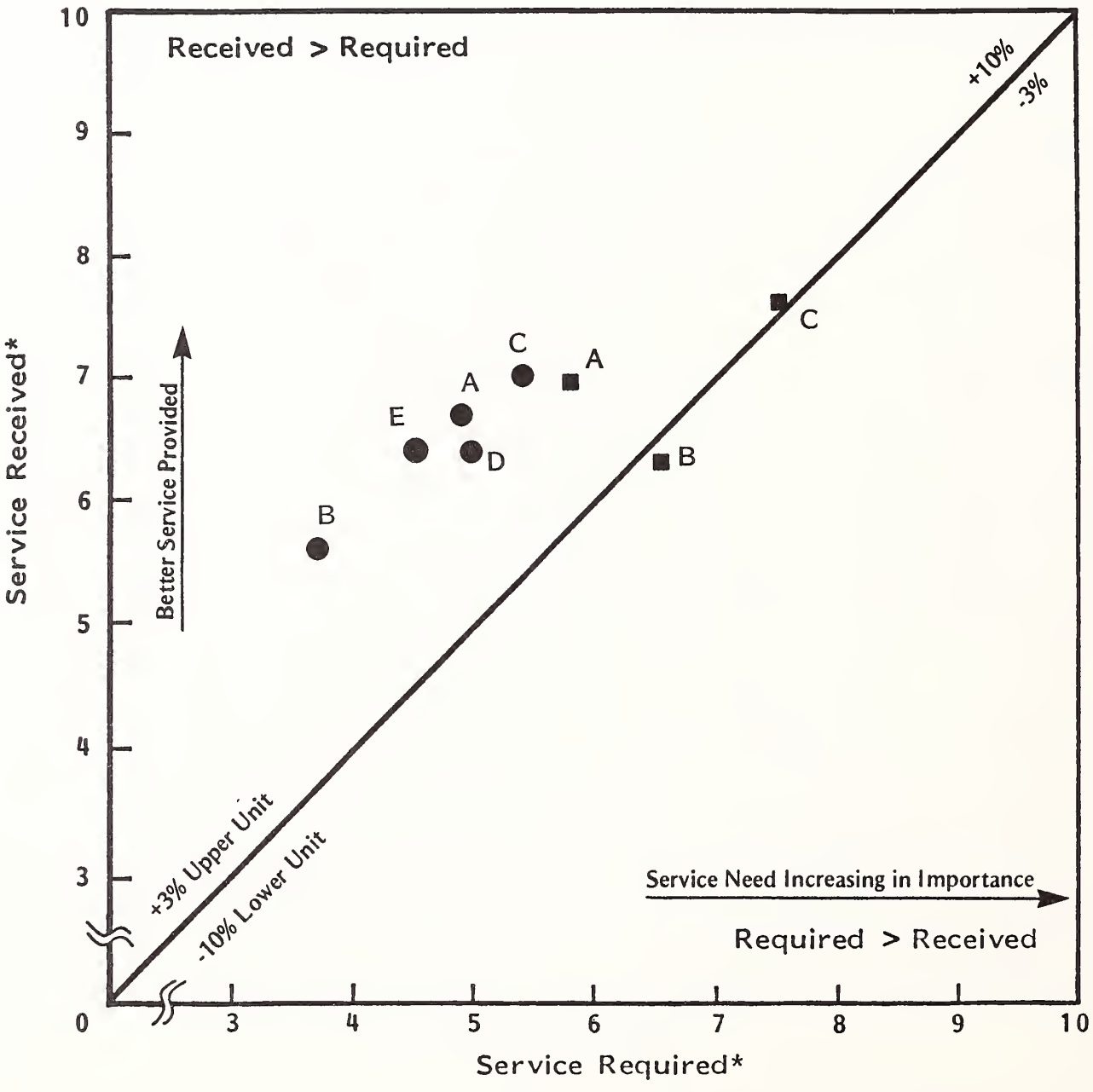
● TPM Small System User Response
■ MFR Small SystemUser Response

A = Consulting
B = Training
C = Documentation
D = Add On/Supplies Sales
E = Relocation/Deinstallation

*Rating: 1 = Low, 10 = High

EXHIBIT IV-14

USER SATISFACTION WITH POST-SALE SUPPORT REQUIRED/RECEIVED
PRODUCT: PERIPHERALS



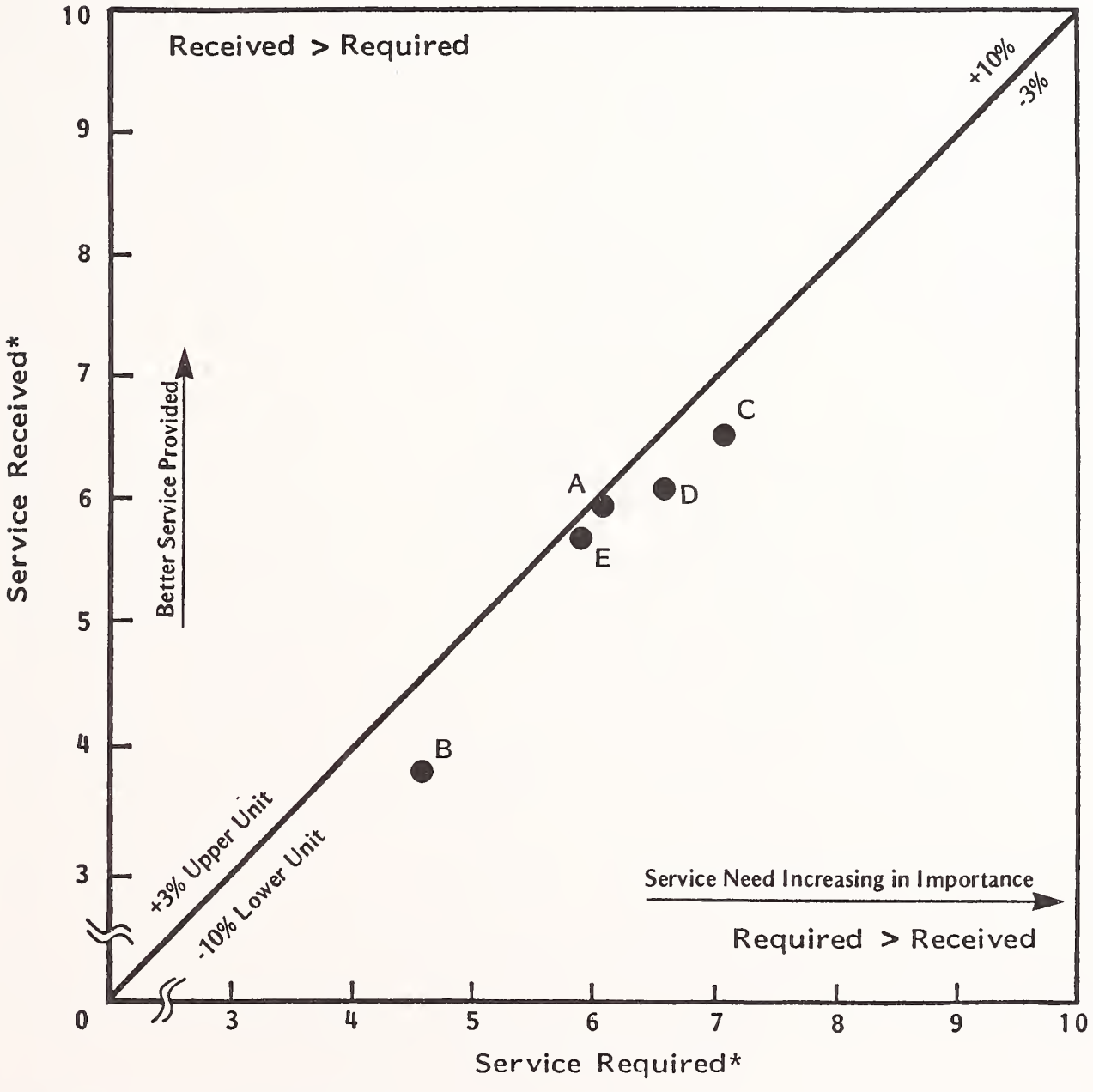
● TPM Peripheral User Response
■ MFR Peripheral User Response

A = Consulting
B = Training
C = Documentation
D = Add On/Supplies Sales
E = Relocation/Deinstallation

*Rating: 1 = Low, 10 = High

EXHIBIT IV-15

USER SATISFACTION WITH POST-SALE SUPPORT REQUIRED/RECEIVED
PRODUCT: MICROCOMPUTERS



● TPM Microcomputer User Response

A = Consulting
B = Training
C = Documentation
D = Add On/Supplies Sales
E = Relocation/Deinstallation

*Rating: 1 = Low, 10 = High

documentation support, and add-on/supplies sales, where microcomputer users place a relatively high value yet express concern over the service level that they currently receive. This is a service area that manufacturers will undoubtedly exploit as they attempt to wrestle control over corporate users of microcomputer maintenance contracts. Some large TPM companies, such as Sorbus, already offer such services as supplies sales.

V NEW DIRECTIONS IN TPM MARKET

V NEW DIRECTIONS IN TPM MARKET

A. SOFTWARE SUPPORT AS A GROWTH AREA

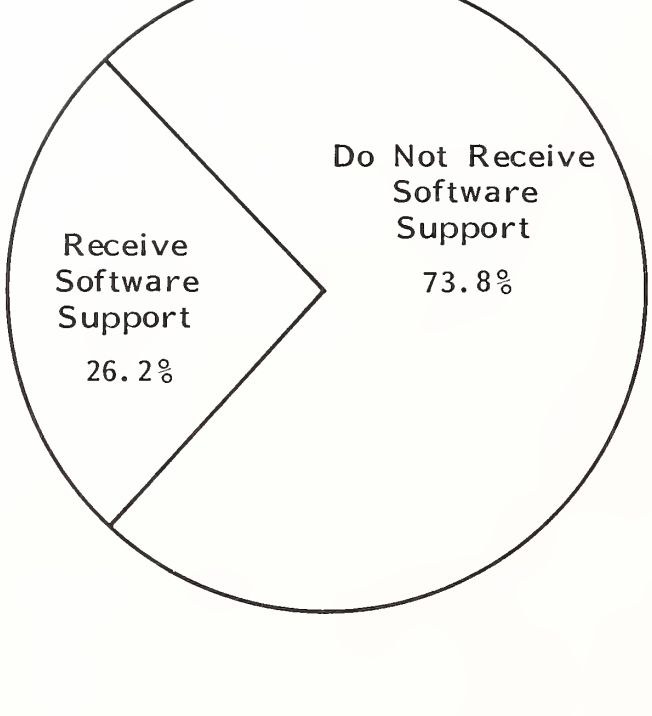
- Third-party maintenance organizations have traditionally marketed the benefits of TPM to users as "single-source," or their ability to maintain more than one manufacturer's hardware. This ability eliminates the headache users with mixed shops often face as competitive manufacturers "point the finger of blame" during fault determination and problem resolution.

- Yet even though most TPM companies do provide the user with multi-manufacturer service capabilities (although no TPM vendor can provide the capabilities of effectively servicing all manufacturers' products), these vendors have been slow in developing software support capabilities, as shown in Exhibit V-1. As a result, the very companies that extoll the virtues of single-source service vendors and denounce the act of "finger pointing" end up referring users to the software vendor or, in the case of system software, back to the original manufacturer if the system interruption is determined to be software in nature.

- It is easy to see how software support has been a weak spot in the TPM market. Software support requires entirely different skills and capabilities. Some equipment manufacturers even have little or no coordination between hardware maintenance and software support, with each function often separated into different groups within the corporate organizational structure.

EXHIBIT V-1

TPM USERS WHO RECEIVE SOFTWARE SUPPORT



If Not Receiving Software Support	
Software Support	Requirement*
Telephone Support	5.0
Remote Patches and Fixes	4.8
On-Site	4.6

*Scale: 1 = Low Requirement, 10 = High Requirement.

- The benefits of providing software support are many.

  - Software support is potentially a much more lucrative market than hardware maintenance. After the initial costs of implementation (recruitment, training, installation of remote support capabilities, etc.), software support can provide another continual flow of revenue.

  - Software support eliminates sending a user back to the equipment manufacturer, which will lessen the chances of a user deciding to return to that manufacturer for all support needs.

  - Software support extends the concept (and the benefit) single-source services provided away from "hardware maintenance only" to "total support provider." This will improve user satisfaction and eventual account control.

- Exhibit V-1 shows that only 26% of the 1985 TPM user sample receive software support from their TPM vendors. This support most frequently was in the area of custom programming, but could include such software remedial support as actual fixes.

- Even though the exhibit indicates that TPM users currently do not place a relatively high requirement on receiving software support from their TPM vendor, the strategic (and ultimately financial) value of such an offering is unquestionable.

- Note that the users also place the lowest requirement for on-site software support. This demonstrates the increased user awareness of the importance of telephone and remote support as cost effective delivery methods for software support.

- The fact that the current users downplay the importance of software support illuminates an obstacle that equipment manufacturers have already experienced in supplying a coordinated hardware maintenance/software support product. In many cases, the actual structure of many users' information systems organizations separates hardware and software responsibilities, allocating them to different managers. Manufacturers, therefore, would separate the delivery structure for hardware maintenance and software support.

- Recently, equipment manufacturers have begun combining (or at least better coordinating) the hardware and software service offerings as a result of many factors, such as:

  - Improved coordination and delivery of customer support, eliminating internal "finger pointing" and the resulting delays.

  - Improved account control, with cross-trained field engineers who could become de facto account managers responsible for all service and support needs for a particular customer.

- Certain TPM companies already participate in or have at least targeted software support as a growth area. TRW, GE, and CDC are TPM organizations experienced in software support, with strong "total support" images as a result.

B. INCREASED CONTRACT FLEXIBILITY

- A number of factors have contributed to an increased user sensitivity to computer maintenance and support costs. First, and most obvious, are the effects of economic conditions, which are currently contributing to an overall slowdown in new product deliveries. Second, increased competition, both from manufacturers and other TPM companies, have encouraged many vendors to lower prices both for equipment purchase and equipment service.

- As a result, service has become almost a commodity in the eyes of the user. Increased competition for the service dollar, coupled with a desire to maintain and perhaps increase the service organization's contribution to the company's overall profitability, has encouraged many service organizations to find new ways to increase service offerings and also increase service profitability while satisfying the user's continual desire to reduced service prices.

- One way to satisfy this delemma is to provide a more flexible service offering, one that provides base level support at an economical price while allowing users to choose service upgrades, with appropriate premiums attached, that will complete their service coverage plan. The benefits of such a plan are numerous and include:

  - Hardware maintenance activities becoming less expensive, as improved reliability, improved diagnostics, and improved serviceability increase system availability to well over 95%. User awareness will cause lower prices for these activities anyway.

  - User requirements for other support services, such as consulting, training and, most measureably, software support, will continue to rise dramatically, increasing the value that users associate with these services. As the perceived value of these services rise, user sensitivity to price increases will lessen.

  - Increase service reliability which will remove the perception of TPM vendors as hardware-only service vendors, providing improved customer satisfaction and increased account control.

- TPM vendors will need to satisfy a number of requirements that will result from increased contract flexibility, such as increased paperwork and improved marketing (brochures, advertisements, etc.). Yet TPM firms, given their experience in negotiating most contracts on a box-by-box basis, probably have

less to overcome in this area than manufacturers who have moved in the direction of standardized contracts.

- Exhibit V-2 demonstrates the relative satisfaction levels reported by TPM users concerning contract flexibility.

C. INCREASED USER PARTICIPATION IN MAINTENANCE

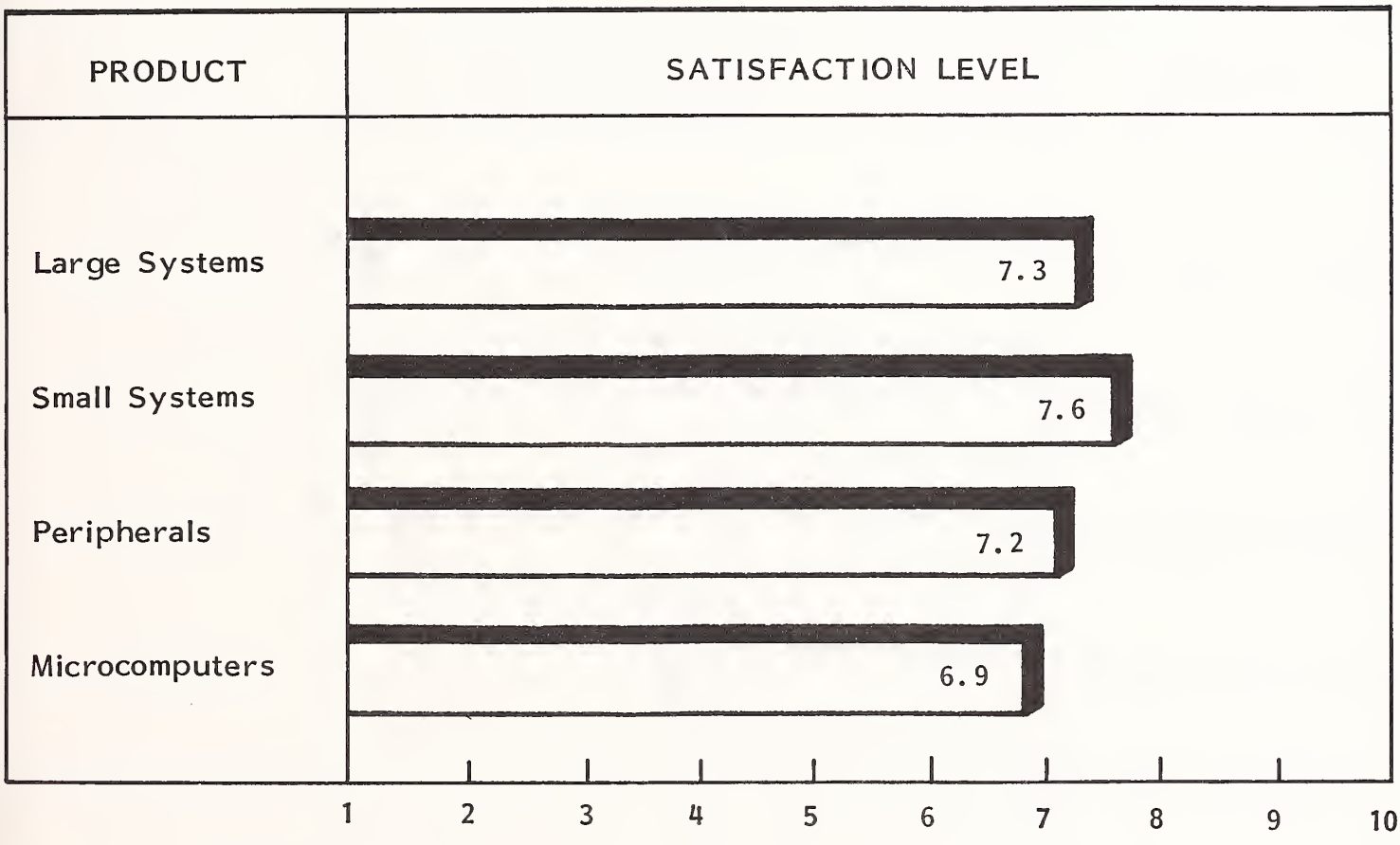
- One area where service vendors have worked with users in maximizing service contract coverage while keeping service prices (for the user) and service costs (for the vendor) down is in providing reduced level service offerings that encourage and in some cases require an increased participation by the user in the maintenance process. In the past, users were responsible for such maintenance activities as carrying moveable terminals, microcomputers, and similar moveable equipment to depot locations and simple diagnosis routines prior to calling for service, up to and including the performance of actual board swaps.

- As the user need for increased system availability encouraged users to require more comprehensive service coverages, such as on-site support, many vendors began offering on-site support instead of or as an alternative to these other service offerings. However, increased user sensitivity to price increases coupled with improved reliability and serviceability of most equipment should encourage vendors to reintroduce these original service offerings.

- Exhibit V-3 indicates that TPM users, like all computer systems users, are very willing to increase their own participation with certain service functions if an appropriate discount is provided. Many manufacturers already provide such incentives, especially to those users involved in some level of diagnosis prior to making a service call. This has eliminated a number of service calls where on-site assistance was not necessarily needed.

EXHIBIT V-2

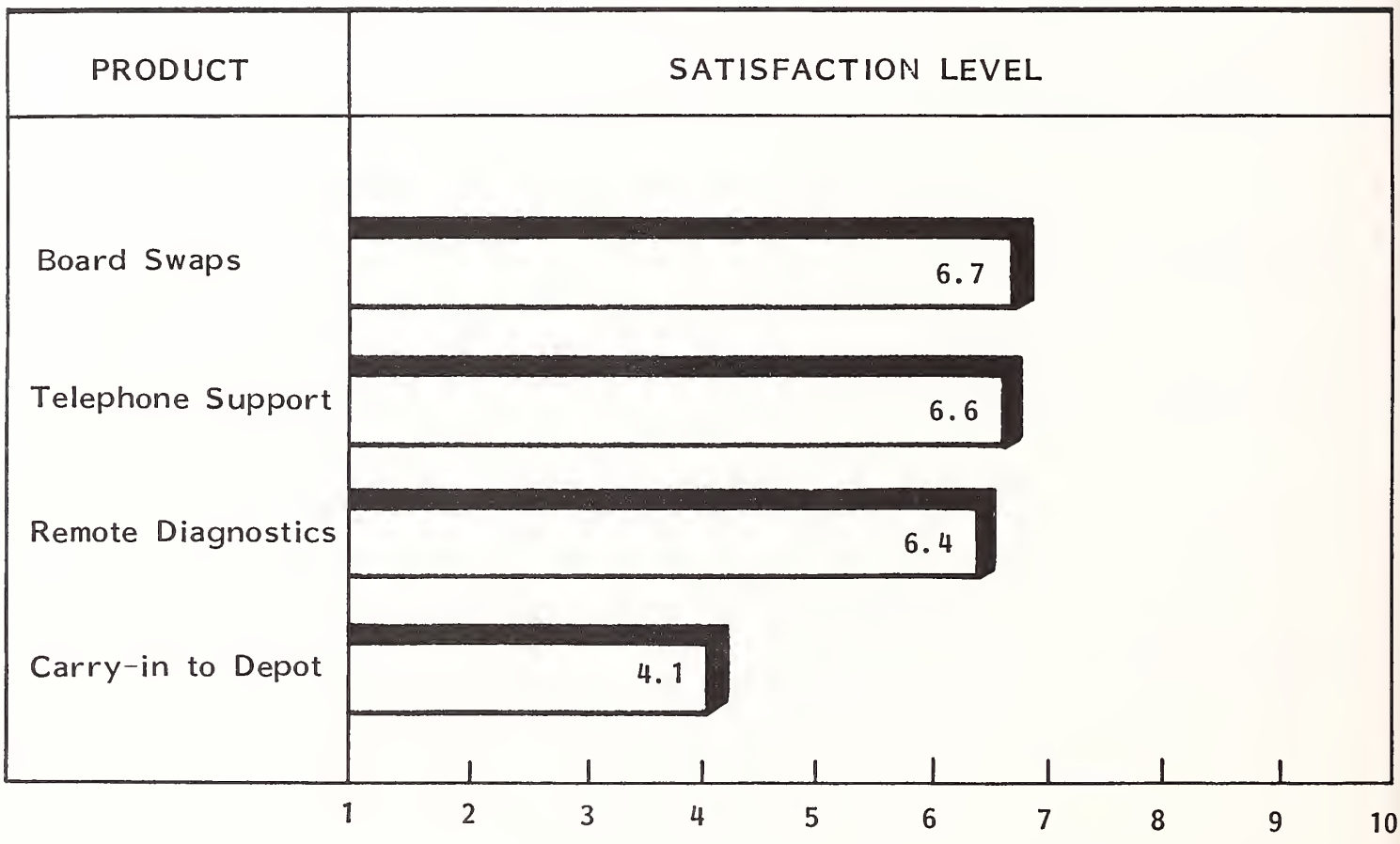
TPM USER SATISFACTION WITH CONTRACT FLEXIBILITY



Rating: 1 = Low, 10 = High

EXHIBIT V-3

TPM USER ATTITUDES TOWARD INCREASED PARTICIPATION
IN HARDWARE MAINTENANCE

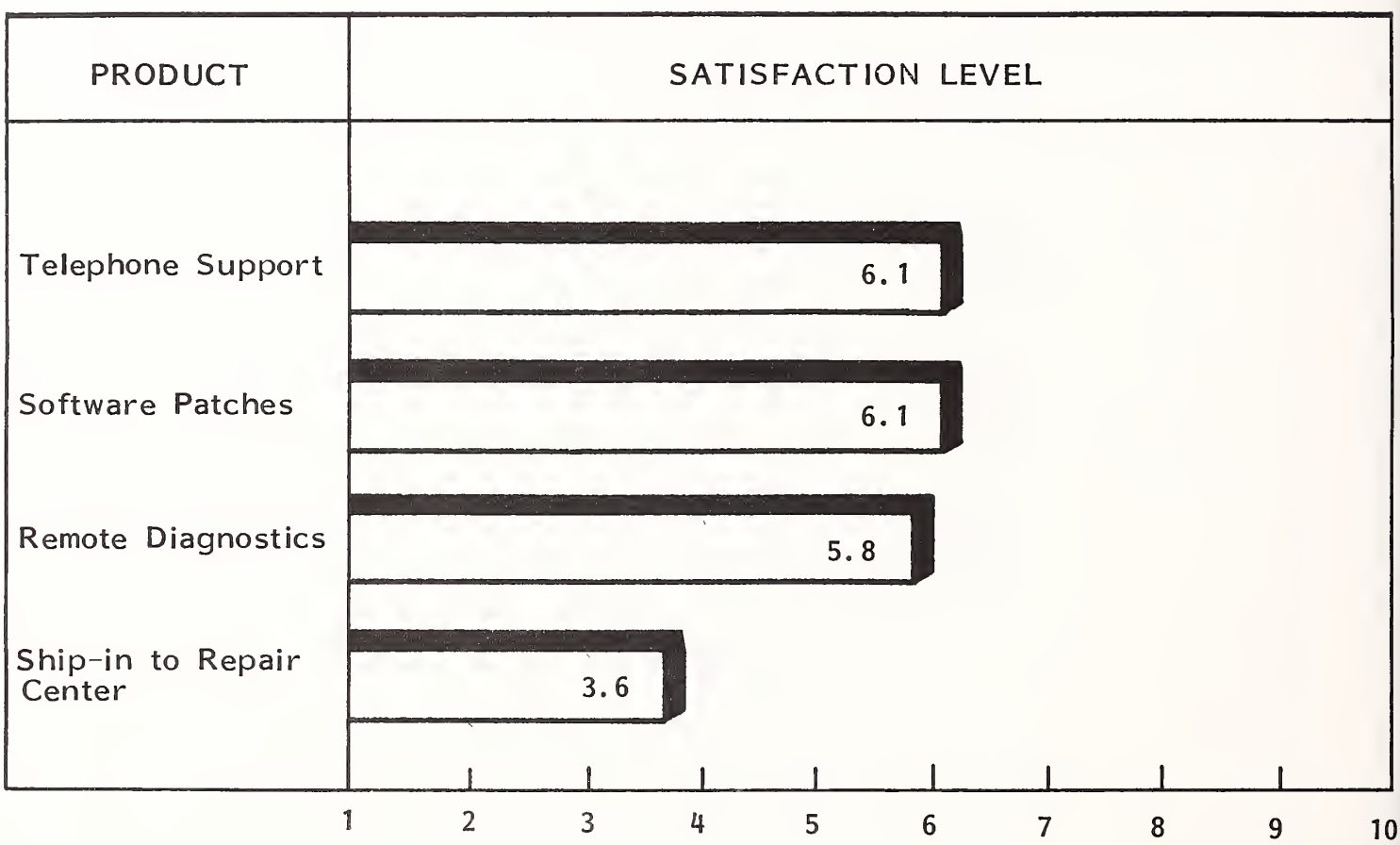


Rating: 1 = Least Willing, 10 = Most Willing

- As with hardware maintenance, a number of TPM users were attracted to telephone support as a service option, as shown in Exhibits V-3 and V-4. Again, a number of manufacturers have already successfully implemented such a telephone support service, with lowered service costs and increased user satisfaction as a result.

EXHIBIT V-4

TPM USER ATTITUDES TOWARD INCREASED PARTICIPATION IN SOFTWARE SUPPORT



Rating: 1 = Least Willing, 10 = Most Willing

APPENDIX A: QUESTIONNAIRE

DEMOGRAPHICS

1. Third-party vendor used: _____

2. Supports which vendor: _____ product: _____

3. Age of product (years): _____

4. Length of service relationship (years): _____

5. Distance from service location to user's site (miles): _____

6. Current maintenance coverage:

   a. Contract: _____

      1. Days covered: _____

      2. Hours covered: _____

   b. Time and Material: _____

   c. On-site: _____

   d. Depot: _____

      1. Carry-in: _____

      2. Mail-in: _____

      3. Courier: _____

PURCHASING CRITERIA

7. How important, on a scale of 1 to 10 (1 = least important, 10 = most important), were the following factors in choosing third-party maintenance (TPM) as your service source:

		Importance 1-10
a.	Price	_____
b.	Georgaphic proximity	_____
c.	TPM vendor reputation	_____
d.	Ability of TPM vendor to service mixed-vendor hardware	_____
e.	Improved response time	_____
f.	TPM was only service available	_____
g.	Availability of SW support	_____
h.	Other (specify: _____)	_____

8. What percent discount over manufacturer-supplied maintenance do you expect for choosing TPM? _____%

CUSTOMER SERVICE REQUIREMENTS

9. (Ask only if user receives on-site service. If not, go to Q10)

   a. What is your requirement for response time (hours): _____

   b. What do you receive, on the average (hours): _____

10. (Ask only if user receives on-site service. If not, go to Q11)

    a. What is your requirement for repair time (hours): _____

    b. What do you receive, on the average (hours): _____

11. (Ask only if user receives depot service)

    a. What is your requirement for total turnaround time for service (hours): ____

    b. What do you receive, on the average (hours): _____

12a. Do you have a requirement (1 = lowest requirement, 10 = highest requirement), for any of the following services?

b. How satisfied (1 = least satisfied, 10 = most satisfied), are you with the service you receive?

		a Requirement	b. Satisfaction
1.	Consulting	_____	_____
2.	Training	_____	_____
3.	Documentation	_____	_____
4.	Add-on/Supplies Sales	_____	_____
5.	Relocation/Deinstallation	_____	_____

13. How satisfied (1 = least satisfied, 10 = most satisfied) are you with your TPM vendor about the following:

		Satisfaction 1 - 10
a.	FE skill level	_____
b.	Hardware maintenance	_____
c.	Parts availability	_____
d.	Dispatching	_____
e.	Contract flexiblility	_____
f.	Other (specify: _____)	_____

SOFTWARE SUPPORT

14. Do you currently receive your system software support from your TPM vendor?
Yes ☐ No ☐

a. If yes, how satisfied (1 = least satisfied, 10 = most satisfied), are you with your support? _____

b. If no, please rate your requirement (1 = lowest requirement, 10 = highest requirement), for the following software support services:

	Requirement 1 - 10
1. On-site system software support	_____
2. Telephone support	_____
3. Remote patches and fixes	_____

USER PARTICIPATION IN MAINTENANCE

15. How willing, on a scale of 1 to 10 (1 = now willing, 10 = very willing), are you to participate in the following alternative maintenance methods (both hardware and software)?

	HW	SW
a. Remote Diagnostics	_____	_____
b. Telephone Support	_____	_____
c. User Performing Board Swaps/ Software Patches	_____	_____
d. Ship-in/Carry-in to Depot	_____	_____

16. Which new areas of service would you like your TPM vendor to cover? _____

_____

_____

_____

_____

17. Does your company expect to increase or decrease its use of TPM services over the next year? _____

_____

_____

_____

Thank You!

APPENDIX B: DATA BASE STRUCTURE

APPENDIX B: DATA BASE STRUCTURE

FIELD	FIELD NAME	TYPE	WIDTH	DEC
1	CATNO	Numeric	5	1
2	COMPANY	Character	30	
3	ADDRESS	Character	20	
4	CITY	Character	20	
5	STATE	Character	2	
6	ZIP	Character	5	
7	REVENUES	Numeric	7	1
8	EMPLOYEES	Numeric	6	
9	NAME	Character	30	
10	TITLE	Character	20	
11	AREA	Character	3	
12	PHONE	Character	8	
13	INDUSTRY	Character	25	
14	PRODUCT	Character	2	
15	Q1	Character	25	
16	Q2A	Character	20	
17	Q2B	Character	15	
18	Q3	Numeric	3	1
19	Q4	Numeric	3	1
20	Q5	Numeric	3	
21	Q6A	Character	1	
22	Q6A1	Character	3	
23	Q6A2	Character	3	
24	Q6B	Character	1	
25	Q6C	Character	1	
26	Q6D	Character	1	
27	Q6D1	Character	1	
28	Q6D2	Character	1	
29	Q6D3	Character	1	
30	Q7A	Numeric	2	
31	Q7B	Numeric	2	
32	Q7C	Numeric	2	
33	Q7D	Numeric	2	
34	Q7E	Numeric	2	
35	Q7F	Numeric	2	
36	Q7G	Numeric	2	
37	Q7H1	Character	10	
38	Q7H2	Numeric	2	
39	Q8	Numeric	3	
40	Q9A	Numeric	5	1
41	Q9B	Numeric	5	1
42	Q10A	Numeric	5	1
43	Q10B	Numeric	5	1
44	Q11A	Numeric	5	1
45	Q11B	Numeric	5	1
46	Q12A1	Numeric	2	
47	Q12B1	Numeric	2	
48	Q12A2	Numeric	2	

FIELD	FIELD NAME	TYPE	WIDTH	DEC
49	Q12B2	Numeric	2	
50	Q12A3	Numeric	2	
51	Q12B3	Numeric	2	
52	Q12A4	Numeric	2	
53	Q12B4	Numeric	2	
54	Q12A5	Numeric	2	
55	Q12B5	Numeric	2	
56	Q13A	Numeric	2	
57	Q13B	Numeric	2	
58	Q13C	Numeric	2	
59	Q13D	Numeric	2	
60	Q13E	Numeric	2	
61	Q13F1	Character	10	
62	Q13F2	Numeric	2	
63	Q14	Numeric	2	
64	Q14A	Numeric	2	
65	Q14B1	Numeric	2	
66	Q14B2	Numeric	2	
67	Q14B3	Numeric	2	
68	Q15A1	Numeric	2	
69	Q15A2	Numeric	2	
70	Q15B1	Numeric	2	
71	Q15B2	Numeric	2	
72	Q15C1	Numeric	2	
73	Q15C2	Numeric	2	
74	Q15D1	Numeric	2	
75	Q15D2	Numeric	2	
76	Q16	Character	40	
77	Q17	Character	20	

APPENDIX C: DEFINITIONS

APPENDIX C: DEFINITIONS

- APPLICATIONS SOFTWARE - Software that performs processing to service user functions.

- CONSULTING - Includes analysis of user requirements and the development of a specific action plan to meet user service and support needs.

- DISPATCHING - The process of allocating service resources to solve a support-related problem.

- DOCUMENTATION - All manuals, newsletters, and text designed to serve as reference material for the ongoing operation or repair of hardware or software.

- END USER - May buy a system from the hardware supplier(s) and do his own programming, interfacing and installation. Alternatively, he may buy a turnkey system from a systems house or hardware integrator.

- ENGINEERING CHANGE NOTICE (ECN) - Product changes to improve the product after it has been released to production.

- ENGINEERING CHANGE ORDER (ECO) - The follow-up to ECNs which include parts and a bill of material to effect the change in hardware.

- ESCALATION - The process of increasing the level of support when and if the field engineer cannot correct a hardware or software problem within a prescribed amount of time, usually two to four hours for hardware.

- FIELD ENGINEER (FE) - For the purpose of this study, field engineer, customer engineer, serviceperson, and maintenance person were used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

- HARDWARE INTEGRATOR - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. He may also develop control system software in addition to installing the entire system at the end user site.

- LARGE SYSTEM - Refers to traditional mainframes including at the low end IBM 4300-like machines and at the high end IBM 308X-like machines. Large systems have a maximum word length of 32 bits and a standard configuration price of $350,000 and higher.

- MEAN TIME BETWEEN FAILURES (MTBF) - The elapsed time between hardware failures on a device or a system.

- MEAN TIME TO REPAIR - The elapsed time from the arrival of the field engineer on the user's site until the device is repaired and returned to the user for his utilization.

- MEAN TIME TO RESPOND - The elapsed time between the user placement of a service call and the arrival at the user's location of a field engineer.

- MICROCOMPUTER - A microprocessor-based single- or multi-user computer system typically priced less than $15,000. A typical configuration includes an 8- or 16-bit CPU, monitor, keyboard, two floppy disk drives, and all required cards and cables.

- MINICOMPUTER - See Small System.

- OPERATING SYSTEM SOFTWARE (SYSTEMS SOFTWARE) - Software that enables the computer system to perform basic functions. Systems software, for the purposes of this report, does not include utilities or program development tools.

- PERIPHERALS - Includes all input, output, and storage devices, other than main memory, which are locally connected to the main processor and are not generally included in other categories, such as terminals.

- PLANNING - Includes the development of procedures, distribution, organization, and configuration of support services. For example, capacity planning, "installation" planning.

- PLUG-COMPATIBLE MAINFRAME (PCM) - Mainframe computers that are compatible with and can execute programs on an equivalent IBM mainframe. The two major PCM vendors at this time are Amdahl and National Advanced Systems.

- SMALL BUSINESS COMPUTER - For the purpose of this study, a system which is built around a Central Processing Unit (CPU), has the ability to utilize at least 20M bytes of disk capacity, provides multiple CRT workstations, and offers business-oriented system software support.

- SMALL SYSTEM - Refers to traditional minicomputer and superminicomputer systems ranging from a small multi-user, 16-bit system at the low end to sophisticated 32-bit machine at the high end.

- SOFTWARE ENGINEER (SE) - The individual that responds (either on-site or via remote support) to a user's service call to repair or patch operating systems and/or applications software.

- SOFTWARE PRODUCTS - Systems and applications packages which are sold to computer users by equipment manufacturers, independent vendors, and others. Also included are fees for work performed by the vendor to implement a package at the user's site.

- SUPERMINICOMPUTER - See Small System.

- SYSTEM INTERRUPTION - Any system downtime requiring an Initial Program Load (IPL).

- SYSTEMS HOUSE - Integrates hardware and software into a total turnkey system to satisfy the data processing requirements of the end user. May also develop system software products for license to end users.

- THIRD-PARTY MAINTENANCE (TPM) - Any service provider other than the original equipment vendor.

- TRAINING - All audio, visual, and computer based documentation, materials, and live instruction designed to educate users and support personnel in the ongoing operation or repair of hardware and software.

- TURNKEY SYSTEM - Composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.